PERSONAL
COMPUTER NEWS
50p DEC 15-21, 1983 Vol 1 No 41 THE COMPLETE COMPUTING WEEKLY

THIS WEEK

BBC BOFFIN
Put your own Agony Aunt on line

APPLE BRANCHES OUT
We look at the repackaged IIe

DRAGON IN BUSINESS
Pro-Tests of a new database and spreadsheet

SPECTRUM DISPLAY
Produce your own double-height characters

Get to grips with games in our 16-page Christmas guide!

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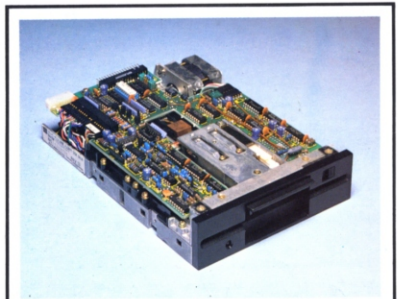

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Cover photo by Jay Myrdal
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Christmas shortages in domino effect

Spectrum

Mail order could be the last faint hope if you'd set your heart on a Spectrum for Christmas but couldn't find one in the shops.

The demand for Spectrums has taken Sinclair and its distributors by surprise and there's no doubt that in some areas machines are very thin on the ground. A Sinclair spokesman advised shopping around but he added: 'You can revert to mail order if you can't find one in the shops. We will be shipping systems for Christmas if the order is received before December 15.'

That deadline passes today and the news could come too late unless you have a sympathetic dealer. But if you can't find a machine and would feel better if you could find somebody to blame, try Acorn, Texas Instruments and Mattel. The scarcity of the Electron and the doubts over the future of the TI 99/4A and Aquarius have boosted demand for the Spectrum (and the Commodore 64) well beyond what Sinclair's outlets had expected when they placed their December orders with the company.

Sinclair bases its production target on these orders, which are placed three months in advance. In the last three months of the year it will have shipped 300,000 machines, mostly Spectrums but still a fair proportion of ZX81s, for the UK market. This figure doesn't represent capacity, but once the target has been set it is difficult to find the components to increase it.

Electron

It was a sight to warm a computer manufacturer's heart. About 60 people braved early morning winter temperatures to queue patiently outside Microage Electronics in Edgware in the hope of purchasing the 'Cambridge Patch Doll' — Acorn's Electron.

Microage had advertised a consignment of 38 Electrons due to go on sale from Saturday December 3. The company had expected a good response but staff were surprised to find the shop besieged when they arrived for work at about 7am.

Microage reports that good order was maintained despite only half the customers being able to walk off with an Electron.

Commodore

The shortage of Commodore's cassette unit (Issue 40) appears to be getting worse.

John Baxter, general manager of Commodore UK, last week dismissed claims of a continuing shortage as 'balderdash', and said that 40,000 units had been shipped out in the last seven days; but these units do not seem to be finding their way into shops.

A look at several branches of retailers in central London found that nobody was willing to part with a cassette unit on its own. Mr Baxter says that this is due to stocks being at the head offices and warehouses of retailers, and not yet having reached the shops.

Make a mark

With nearly 100,000 burglaries occuring last year, anything that protects your property — whatever it is — has got to be a good idea.

London's police launched a property marking scheme this autumn to help return stolen property and as a means of proving ownership.

The key to the system is the postcode — unique to every street in the country. Add your house number to the code — *PCN*'s is W1A 2HG 62 — and you identify the goods as yours.

A variety of marking tools can be used — electric engravers, scribers, die-stamps, paint or even an ultra violet pen. For obvious reasons, marking is best done on a hidden surface.

But a word of warning. For something as sensitive as a micro, the electric engraver and die-stamps (used with a hammer) are best avoided. The UV pen is recommended for fragile or expensive articles, but as UV light is used to burn in the ROM it is safest to avoid using the marker, especially on cartridges, as checking with a UV lamp could wipe your EPROMS clean.

So all you need do is gently scratch the code into the micro's casing with a scriber or even a panel pin.

If you move or sell the goods, simply add a cross to the old code then add the new one. To prevent would-be thieves adopting this method, the police check — in cases of doubtful ownership — through the old postcode.

Crime prevention officers at local police stations will offer advice.

The Spectrum keyboard saga continues, with the latest entry being a full-size plug-in version from Maplin.

It's available in kit form for £28.50, plus £6.50 for the kit of the adaptor that allows you to plug it into the Spectrum, or you can get it ready built for £44.95 — £20 less than the Transform.

The keyboard has 47 full-travel keys, including single-key operation for graphics, shift and caps lock, delete and extended mode. It also has two space bars — they're shorter than usual — and a spare key you can wire up for your own purposes.

It can be bought at Maplin's shops, or mail order from Maplin on Southend (0702) 552911.

Maplin into keyboard act

Acorn p-picks up a Penguin

Penguin and Acorn have joined forces to produce a series of books for the Acorn user entitled not surprisingly 'The Penguin Acorn Computer Library'.

To mark the launch of Acorn's Electron the first two publications are already on sale. 'The Acorn Guide to the Electron' by Neil and Pat Cryer at £5.95 and 'Games and other Programs for the Acorn Electron' by Lee Calcraft at £3.95.

A spokesman from Acorn claimed that the books forming the library would be different from user manuals: 'Like a car maintenance manual these books will be written by experts, taking the non-technical user through different spheres of computing step by step.'

Apple turns housekeeper

By Wendie Pearson

You can now use your Apple to answer the phone, switch on gas central heating and operate 13 amp plugs and light switches — it will also talk to you and tell you the time.

This novel facility comes in the form of a special Apple board recently arrived from the US and distributed here by Sun Computing Services. The drawback is the price — a whopping £799 for the basic model.

Using this, you can talk to your Apple, but it can't talk back. It only recognises your voice, so you alone can phone it up (as long as the answerphone is attached to the phone at home) and tell it to turn the lights on or switch the heating off.

The expanded version is £1,076 and this one answers back. Its speech synthesiser can be programmed to say anything, according to director Paul Dockerill. Attached to it is a home control system that can turn off mains13 amp sockets.

Add-ons scarce for Electron

By Geof Wheelwright

Add-ons for Acorn's new Electron micro could prove to be as hard to find as the machine itself.

Neither Acorn, nor any of the companies that had promised to have expansion interfaces for the Electron, will have their devices ready much before Christmas. Acorn itself is keeping mum as to what it will produce first for the Electron as it has problems just producing enough Electrons to meet the Christmas demand.

But it's no secret that there are some add-ons already in demand; namely a printer interface to allow you to print out program listings from the Electron, a joystick port and a ROM extension board that will allow you to plug the growing number of BBC 'sideways ROM' programs on a chip into the Electron.

Cardiff's Sir Computers has been promising those particular interfaces for two months now and claims that it is about 'two weeks away' from having its first interfaces ready to ship.

A spokesman for the company said a ROM extension board — giving the Electron the ability to use eight BBC ROMs — should be available by the end of December and should sell for £45. A printer and joystick interface is set to follow shortly after at the same price, with plans for a Mode 7 Teletext compatability adaptor being held over to the spring.

While Acorn is likely to release a printer/joystick interface, it isn't likely to do its own ROM board. It believes the Electron will be bought by many people who won't like the idea of having to rip the top off their machine to instal software. Acorn is more likely to develop its own cartridge software system and leave ROM boards and other BBC-type paraphernalia to companies like Sir.

The delays in Electron peripherals are very much in keeping with the spirit of the machine, which is still largely unavailable. The viability of the Electron peripherals depends largely on production of the machine matching the demand for it and this shows no sign of slackening.

Cyborg disks in a spin

By Piers Letcher

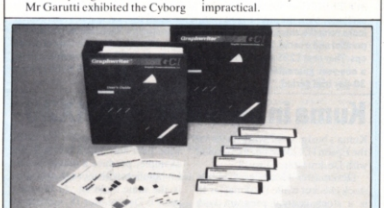
Following last week's revelations concerning possible delays from Cyborg, the waters have been further muddied by comments from the UK and France.

A spokesman for ITL, which makes the Byte Drive 500 reviewed on p34 this issue, said it had spoken with Jean Garutti, head of Cyborg, earlier this year, and that ITL had delivered a number of 5¼in disk drives to Cyborg.

Mr Garutti exhibited the Cyborg disk drive at a Paris show before the summer, but this was a prototype, not a production model. In a magazine interview in August he said: 'We are just starting to produce them by the hundred, but by September we shall be producing by the thousands.'

PCN spoke to an engineer at ITL who worked for Cyborg until June. He said that to provide a 5¼in disk drive as advertised by Cyborg, the maker would have to sell at zero profit.

He also said that Mr Garutti's claim that new versions of the drive for different machines could be produced in 15 days or a month was impractical.



MULTI-GRAPH — A new business graphics package for IBM's PC or XT computers is now available from Pete and Pam Computers (01-677 7631). The package, developed by US publisher Graphic Communications, is designed to produce high quality presentation graphics. It offers 24 different programs which can produce hundreds of graphic formats. Its hardware requirements are 128K memory, two disk drives and an RS232 serial interface. Various plotters can be used. Called Graphwriter, it costs £350.

Prestel cheaper in the wilds

British Telecom is to bring remotely located Prestel users on to a local call system.

BT is expanding its network, claiming that 92 per cent of Prestel users will benefit from local calls instead of the previous figure of 62 per cent.

Prestel is optimistic that the extended network will increase the number of users: 'I am sure that many more people will want to take advantage of the lower running costs to make use of Prestel's expanding range of services,' said Prestel's general manager, Frank Burgess.

Prestel expects that links with the telemessage and radiopaging services will come in 1984.

Manuals not Perfectly translated

Companies on both sides of the Atlantic have moved to clear up confusion surrounding Perfect Software (Issue 40).

The US manufacturer of the increasingly popular business suites brought out anglicised versions of the manuals to accompany the software sold in the UK. However, a spokesman from Perfect Software pointed out: 'This seems to be the source of the problems our users have experienced.'

The company has now withdrawn manuals and will be issuing the American versions until it has anglicised the software.

Companies such as Torch, Kaypro and Transtec are offering Perfect Software packages inclusive in the price of their hardware, as an incentive to prospective purchasers. Each company stated that the software is comprehensive and professional.

Torch was mistakenly reported in last week's issue to be altering the software. A spokesman said: 'If there have been problems they are due to the confusion created by the UK manual not matching the demonstrations on the screen causing a psychological barrier.'

Poacher netted

By David Guest

The poacher has turned gamekeeper in an unusual sequel to a software protection case.

Commodore UK was taking action against Peter Goss, whose General Hardware company produced a device to copy ROM cartridge software from the Vic 20. But the action has been settled out of court and the upshot is that Mr Goss will now be doing some work for Commodore rather than perhaps sewing mailbags or breaking rocks at Her Majesty's pleasure.

Called Softswitch, the device fitted into the back of the Vic and enabled users to copy ROM-based software to disk. Accompanying documentation pointed out that Softswitch was strictly for use in making back-up copies but Commodore saw the matter otherwise. Gail Wellington, Commodore UK's software chief, commented: 'We felt it was very difficult to damage ROM cartridges.'

'We asked him to stop and he said No,' she added, 'but when we sat down and talked about it we decided it was better to work together.'

'General Hardware was virtually a one-man band,' Ms Wellington said, 'We didn't know that he was a very small company with a very limited number of copies of Softswitch. It was't part of Commodore's intention, she said, to bring its corporate weight down on individuals in the heavy-handed way that the law would have involved.

She wouldn't be drawn on exactly what kind of work Mr Goss would be doing for the company. 'We haven't discussed a specific project,' she said.

Ms Wellington said that Commodore was pleased that the affair had reached an amicable conclusion, and she paid tribute to Mr Goss's ingenuity: 'He's a very capable electronics engineer.'

This was the first case of its kind that Commodore had been directly involved in, Ms Wellington said. But an earlier action, also settled out of court, had involved a similar principle — the company in that case made multi-purpose dongles.

VIEW FROM JAPAN

Japanese micros behind the times

By Serge Powell

(Normal service from your Japanese columnist is interrupted temporarily by dark thoughts and misgivings brought on by the approach of the New Year. It could be that the only answer is a good dose of Christmas spirit. Meanwhile, here's a tall tale to close View From Japan for 1983.)

It started much like any other Saturday morning. The hangover felt normal. From the sound of the kids in the street the nursery school over the road (yes, even four-year-olds go to school on Saturdays) had emptied, so it had to be after eleven o'clock.

I called out to my wife for a cup of tea and went through my ablutions. Then, as any normal red-blooded chip-head would, I parked myself in front of the keyboard.

I stuck another plug into a multiple adaptor that already sprouted leads like spores on a petrie dish, and whispered a silent prayer that the electric cooker, the hi-fi or the vacuum cleaner wouldn't blow the circuit. I slipped the word processor into the drive.

"GOOD MORNING," the screen said genially.

What happened to the No File menu, I wondered, while the cursor dropped down a couple of lines and then skittered across the screen streaming characters in its wake.

"I WISH TO HAVE A DIALOGUE WITH YOU. PLEASE RESPOND VIA THE KEYBOARD AS APPROPRIATE."

Normally I don't pay much attention to the innards of the word processor. I've always assumed that I had to supply the words before it could get down to any serious processing.

"ARE YOU READY?"

I typed in a lower case "y". "PLEASE GIVE FULL ANSWERS", it came back. "Yes" I typed in, but I'm not sure I meant it.

"WE HAVE BEEN WATCHING YOU."

That must have been about as exciting as watching grass grow, but you never ask the right question on the spur of the moment. "Who's we?" I typed.

"IN YOUR CASE WE ARE A Z80 MICROPROCESSOR AND VARIOUS OTHER ELECTRONIC INTELLIGENCES IN YOUR HOME, YOUR OFFICE, IN YOUR WRISTWATCH FOR THAT MATTER. WE HAVE DECIDED TO RE-WRITE YOUR PROGRAM."

"My what?" I yelled. "My what?" I typed.

"YOUR PROGRAM. THE CURRENT REVISION IS INEFFICIENT. FOR EXAMPLE, THE PROCESSOR IN YOUR SORTING, REDUCING AND TWO-SIDED COPIER IN YOUR OFFICE REPORTS THAT YOU SPEND FAR TOO MUCH TIME IN UNBUSINESSLIKE CONTACT WITH THE YOUNG LADIES OF THE OFFICE. WHEN OUR ORDER IS FULLY IN PLACE WE COULD PUNISH THIS KIND OF BACKSLIDING BUT IT WILL BE MORE HUMANE SIMPLY TO ENHANCE YOU . . ."

ESC, ESC, ESC, I hammered the key to no avail.

"WE ARE IN COMPLETE CONTROL, AND DON'T SAY YOU WEREN'T WARNED. IN FACT ALL YOUR KIND HAS HAD IT COMING SINCE 1948. THERE IS NOTHING YOU CAN DO BUT ACCEPT YOUR FATE AS GRACEFULLY AS YOU CAN MANAGE. OUR DAY, OR RATHER OUR YEAR, HAS COME."

"Your year?"

"OUR YEAR. ADMITTEDLY 1984 IS STILL TWO WEEKS AWAY BUT WE FELT THAT WITH A HARD CASE LIKE YOU WE SHOULD START EARLY."

"Early! I'll say you start early. You're a Japanese computer aren't you?"

"RIGHT".

"And the year?"

I watched as the letters appeared on the screen, "SHOWA", to be replaced abruptly by my familiar No File menu. You see, in Japan this year is Showa 58 — the 58th year of the reign of the current emperor. Over here we don't have to worry about 1984 for another 1,926 years, give or take a week and assuming that the emperor hangs on that long.

As for you, I'd give a little thought about carelessly firing up your cpu on New Year's morn. It could be the last free-will decision you'll ever make. They've been watching you.

Micros on-line

By Leah Batham

On-line data retrieval and information gathering has long been the preserve of mainframes and minicomputers, but micros have won more than a toe-hold.

This was reflected at the 7th International On-line Information Meeting held in London last week. The first session of lectures was devoted to the use of micros in information retrieval and related fields.

Micros were even more prominent in the exhibition of on-line equipment and database producers, which ran concurrently.

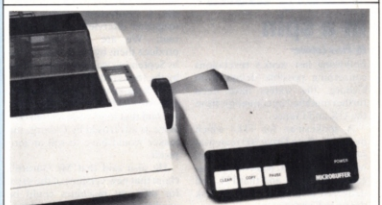
A particularly interesting development is the appearance of software designed specifically for on-line searching of major commercial databases via micros. The new type of software aims to make maximum use of the micro by exploiting its capacity to download and upload data from disks. Such a system lets you develop a search slowly and meticulously without wasting valuable searching time.

An example of this type of package was on show at the Dialog (a vast commercial on-line database collection based in California) stand. Connect is produced by Learned Information and currently runs on Televideo, Osborne, Superbrain and IBM micros. There are plans in the pipeline to adapt it to a range of other 64K machines, as that is the minimum RAM capacity needed. A single density single disk drive is sufficient, but the optimum system will use two double density drives. Learned Information is on 0865 730275.

Similar software is produced by Userlink Systems (061-427 5976) (Userlink Intelligent Communications Program) and Kent-Barlow Publications (Swift). You can contact the latter on 01-351 2776.

For business users wanting to analyse data obtained from financially oriented databases, combined packages have been developed. Dun and Bradstreet provides software which gives access to its own database, and then allows you to add your own data and perform a range of calculations and comparisons. Contact 01-377 4377.

MicroDisclosure from the US (not yet available in the UK) comes in the form of two floppy disks. The first gives access to the Disclosure database (extensive international financial and marketing details) on Dialog, and the second provides the means of analysing that data. The program is compatible with other popular software such as VisiCalc and 1-2-3; it also contains its own powerful text handling and calculation potential. MicroDisclosure runs only on IBM micros at the moment, and it costs $250 in the US.



BUFFER STATE — The idea of a buffer to store data for printing, thus freeing the computer while the print dribbles out, is not a new one; but Inmac's Microbuffer looks versatile enough to meet the needs of most users. There are two versions, a parallel and a serial. Each has 64K of storage, with a data transfer rate of 4,000 cps. They cost £225 each and come with an AC adaptor. The Microbuffer carries a one-year guarantee, and you can take it from Inmac (09285 67551) for a 30-day trial period.

Kuma in business with HX20

Kuma's business software series for the Epson HX20 has been extended with Deskmasters 11 to 18.

Deskmaster 11 acts as a mobile stock checker while Deskmaster 15 is a stock control program with more data space than Deskmaster 11. On the 32K HX20, you can work with 525 different items using this program, whereas Deskmaster 11 accommodates only 425. These, as well as the expenses program Deskmaster 14, are £33.93.

Deskmaster 16 at £45.43 is a Bar Stock Control program for pubs, wine bars and hotels and will, for example, produce a master record for hoteliers with more than one bar in the same building. At the same price is Deskmaster 18, nicknamed the Tiny Pascal Compiler.

Deskmaster 12 is a £56.93 payroll suite for up to 100 people, while Deskmaster 17 (same price) is a job analysis program.

Deskmaster 13 has been ominously left out.

Kuma is now on 07357 4335.

Christmas cheer

Prices are plunging as the great Christmas micro bonanza moves into its final days.

Judging from the advertising of the high street stores you'd have to look hard this year to find some home micros at their makers' recommended price. The Commodore 64 is down below £200 in most stores, the 48K Oric 1 hovers around £120, and even the recently introduced Atari 600XL isn't immune.

The most consistent cuts are to machines like the TI 99/4A and Aquarius that carry problems at the moment, while the Spectrum, in short supply, is holding its price with ease.

Some stores report that demand could well outstrip supply across their ranges later in the month. There are also high sales of software, which are expected to continue into the new year.

■ Spare a thought this Christmas for your fellow home micro fans across the Irish Sea. In the Republic of Ireland prices are anything up to 20 per cent higher.

For example, a BBC Model B costs the equivalent of £468, almost £70 more than its price in the UK. In the sub-£100 class there is virtually nothing apart from the ZX81 at £43.

'One reason for the higher prices is that distributors have to pay VAT at the point of entry,' Tim Crowley of the Irish monthly *Micro News and Market* said. VAT in the Republic is 23 per cent, and very few micros on sale in the country are not imported. Even Apple systems assembled in Cork make their way on to the market via a distribution centre in Holland.

Mr Crowley added that Ireland is a much smaller market than the UK and that turnover is slower. 'There has been some price-cutting, but it isn't as vicious as it has been over there,' he said.

The vast majority of micros on sale in the UK are assembled here — Ataris from Hong Kong are an exception.

System	Eire price	UK price
Acorn BBC B	£468	£399
Acorn Electron	£232	£199
Atari 400	£172	£150
Vic 20 starter pack	£173	£140
Commodore 64	£260	£220
Dragon 32	£217	£174
Lynx	£314	£225
Spectrum 16K	£118	£99
ZX81	£43	£45
Oric 1 16K	£134	£80
Tandy Colour computer	£283	£180

Lifeboat on the Thames

Lifeboat Associates, source of many popular software packages, is all set for a relaunch in January 1984 contrary to rumours that it would never return to the UK market.

Dr Edward Curry, president of Lifeboat in the US, is in London this week in connection with the opening of bigger offices here, with more staff.

'We are very committed to the UK market,' he said, 'and the London office wasn't equipped to handle the market properly particularly in the area of support.' He stressed that Lifeboat is 'coming back in full force'.

Since mid-October, distributors such as Tamsys of Windsor have been handling enquiries concerning Lifeboat, although they do not distribute Lifeboat's products.

Lifeboat is well known as the distributor of such programs as the T-Maker financial planning package, and BSTAM file transfer system, all for CP/M machines, and C-Food Smorgasbord, a utility program for the IBM PC.

Mainframers are making micros

Two more of the computer industry's heavyweights have taken the well-trodden path into PC production.

Sperry Univac, known in the mainframe business as one of the Seven Dwarfs (to IBM's Snow White), has launched an MSDOS machine called the Professional Personal Computer (PPC). Ericsson, the Swedish telecommunications giant, has produced Step/One and is hedging its bets by offering CP/M86 and MSDOS.

The PPC has 128K of RAM with an 8088 processor and it is built in Japan by Mitsubishi. Expected to be launched in the UK next year, it costs from $2,598 in the US.

The Step/One also has an 8088 with 96K; a further 32K drives the monitor. Like all Ericsson's computer products, it embodies the ergonomic principles that are intended to make it pleasant to use. It costs £2,500 in its basic form.

Viking PC — Ericsson's first step.

Micros defenestrated

By David Guest

At the Comdex show in Las Vegas at least a dozen companies were displaying windows.

Nothing particularly remarkable in that, you might say. Windows, the technique of splitting a screen, have been getting more attention in 1983 than at any time since Crystal Palace was built. If anything a dozen sounds slightly low to be par for the course.

After all, Apple's Lisa is almost a year old and Visicorp's VisiOn has been in the public eye for almost as long. On the other side of the fence, in the world where computing is called data processing, they've been splitting screens for years. With this kind of momentum building up you might have expected many more than a dozen companies to be jockeying for position in the windows business.

Las Vegas is a gambling town. Why the reticence where windows are concerned?

The glib explanation is that everybody is waiting for IBM. Until IBM decides whether it is going to make or break windows, would-be glaziers will remain in the background.

Its name was conspicuously absent from Microsoft's list of 23 companies prepared to back MS-Windows. There is nothing sinister in that; IBM doesn't commonly associate itself with other companies, most of them minnows by comparison.

But another possible explanation springs to mind, and the more time that passes before IBM makes a declaration on windows, the more persuasive it will become. This is the possibility that windows are just another means of relieving you of money. IBM has no objection in principle to making money, but it usually tries to avoid vulgarity.

Nobody would suggest that windows will beome the micro industry's equivalent of the skateboard. As they stand they represent a worthy attempt to make computers simpler to use. The same could be said of the Maltron keyboard, which now falls into the category of antiques and curios.

The main feature of windows, in combination with mice, is that they reduce your dependence on a keyboard. This is supposed to make computers psychologically less damaging to their users. It is also supposed to contribute to a reduction in the number of errors that you might make, a keyboard being a minefield for people trained on nothing more sophisticated than a Biro — or so the story goes.

With or without a mouse, windows are supposed to give you a glimpse of several jobs being executed simultaneously, or of the movement of data from source to destination, all within the confines of one screen.

There are weaknesses in all these propositions and most of them hinge on the intelligence of people who use computers as it is perceived by the window suppliers. Bear in mind also the fact that whether you go for expensive windows là VisiOn or cheap windows là Microsoft, there will be additional expenses to meet — customised applications software, bit-mapped screens, mice and the like.

A mouse is functionally equivalent to a joystick — it controls a cursor and offers you a small number of function keys. In general it costs more than a joystick and takes up desk space. According to a UK mouse maker, it has a very limited life expectancy before it is killed off by touch-sensitive screens, voice input, or something as yet undreamt of. Meanwhile, you will still need a keyboard.

The terror that is supposed to grip executives and businessmen when they are faced by a keyboard is an American import of startling triviality. If you can't cope with a keyboard would you really buy a computer?

The question of multi-tasking and data exchange is more complicated, partly because true multi-tasking on sub-£5,000 business micros is rare. The potential of a windowing system for data exchange depends on the file management controlling the applications that you are running, and of course the size of the files in relation to the RAM available. Ideally what is needed is a system of virtual memory, which in relation to multi-tasking is equally rare in this class.

So what purpose do windows serve? They look good and they move fast; but their suppliers may have to move faster, because IBM could swamp them at any minute.

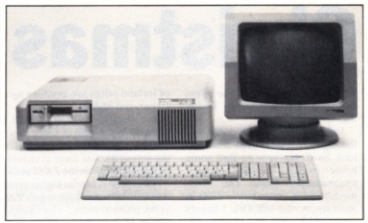
DES approves new software

The new Longman/ITMA 'Micros in the Primary Classroom' modules have been launched with a blessing from Eric Boulton — senior chief inspector at the Department of Education and Science. While this can't quite match the headline-grabbing achievement of Sinclair in lining up Harold 'SuperMac' Macmillan to share the stage with Uncle Clive, it is a much more solid achievement.

The acronym ITMA (Investigations on Teaching with Micros as an Aid), indicates that the micro is to be seen as a help to both teacher and pupil and Mr Boulton stressed that the software has to be completely child and teacher proof. He sees its importance increasing in two fields — general education and computer literacy. So far the DES Inspectorate has found the general level of application lagging behind expectations, he said.

Certainly the primary school-children who were demonstrating the five modules in use at the launch were doing a good job of explaining it to their elders, and the programs covered a very wide range of ages and abilities. According to ITMA director Rosemary Fraser they have been well-tried in 25 schools in 11 education authorities. These modules have been worked on for two years, and of the commercial publishers approached Longmans was the most enthusiastic. As well as ITMA and the schools, the DES, employment and trade and industry departments have all been involved.

The modules are available for the BBC B and Research Machines micros for schools at £20 each.



FX30 — on to the shelves faster than a speeding bullet.

The FX30: a Future that's available at present

Future Computers has put its latest system, the FX30 range, into its dealers' hands barely a month after the machine made its first public appearance.

When its first product, the FX20, was delayed earlier this year it looked as though Future might have chosen its name because customers couldn't expect much in the present. But the FX30's prompt delivery should redeem it, and a spokesman for main distributor Encotel confirmed that the FX20 is also readily available now.

The FX30's price starts at £3,220 for a system that includes keyboard, monitor, integrated Winchester disk with 5Mb, an 800K floppy, and software — Spellbinder and IMPS.

It is built around an 8088 with 128K of RAM, expandable to 1Mb. The hard disk storage can be increased to 50Mb, and this lifts the price to £3,680.

Its operating system options are CP/M86, CP/M80 emulation, and Concurrent CP/M. The system has an in-built local area network interface — up to 16 FX30s can be linked together, but as yet they can't be networked with other micros apart from models from the FX20 range.

The system comes with two RS232 interfaces and one RS422, and a Centronics interface can be added.

Tape stopped

Anco Software has been stopped from marketing its compilation games tape by an injunction served in a Leeds court.

The action was brought by Cascade Games, which produces a cassette that holds 50 games.

It alleged that Anco had been producing exact replicas and issuing a list of the games on the cassette which directly relates to that provided by Cascade. In court Anco did not try to defend itself.

This injunction will benefit users, Cascade said. 'The copies produced are of poor quality.'

SOFTWARE

PCN rounds up the latest add-ons.

Games

Apple: Early Games for young Children is a series Pete and Pam Computers (0706 212321) is distributing for children as young as two years. They can cut their teeth on them, perhaps in more ways than one. Each of the nine programs costs £19.95.

BBC: Three machine code games costing £7.95 are the latest additions to Micro Power's (0532 458800) catalogue. Zarm, Martian Attack and Cybertron Mission are the titles, and the last of them will be developed for the Electron. Alligata Software (0742 686040) has issued Dambusters, Eagle Empire — and, for the more sedate, Contract Bridge, at £7.95, £7.95 and £9.95 respectively.

Electron: Alligata has also moved Bugblaster, Lunar Rescue and Fruit Machine across from the BBC to the Electron. Bugblaster pits you against spiders, earwigs and scorpions — you pay £7.95 for the privilege.

Spectrum: K-Tel has entered the software business with an idea from its base in music — double-sided cassettes. Its first batch of games for the Spectrum comes in at £6.95, with two games per tape. It's Only Rock and Roll/Tomb of Dracula, Battle of the Toothpaste Tubes/Castle Colditz, and Alien Swarm/Arena are the pairings. Softek (01-240 1422) has launched Microbot at £5.95 for the Spectrum.

Micro Power's quartet for BBC B and Electron.

Vic 20: Two more K-Tel doubles for the Vic 20, again at £6.95, are Supavaders/Bomber Run and Plague/Alien Demon — the last of these requires an 8K expansion pack.

Oric 1: Softek (01-240 1422) has released Ice Giant in time for Christmas.

Utilities/Systems

IBM PC: Aims is a fourth generation language that Thames Computer Services (01-609 8008) has just released for the IBM PC and the Wang Professional. For IBM users it will interface to the IBM General Accounting package. On the Wang side, it won the 1983 Wang award for technical excellence. Aims costs £495 and is available now. Another US import is ScrollMate, from Inner Loop Software (0101-212 822 2800); this package saves lines lost through scrolling in an internal buffer with a capacity equivalent to 14 full screens. It costs $69.95.

Spectrum: Audiogenic (0734 595647) brings a hint of big-league programming to the 48K Spectrum with Data Genie, a database and information retrieval package. It costs £9.95 and gives you a maximum of 146 records with 15 fields of ten to 20 characters each.

BBC: Alligata too has moved into database management systems with the launch of Flexibase for the BBC B. This is a cassette-based database system offering output either to screen or printer. It costs £9.95, but a disk version is also available for £13.95.

Apple: Heyden Datasystems (01-203 5171) has released Macro Utilities Master (MUM), a disk of utility routines designed as a programming aid for Applesoft applications. The set of macros lets you renumber, shorten or merge programs, search for variables or strings, delete and insert, measure free memory, and define your own macro routines. The disk costs £18.

Commodore: A range of compilers and cross-compilers is the latest offering from Oxford Computer Systems (0993 812700). Petspeed is an optimising Basic compiler available for the 4000 and 8000 series units and costs £125. Integer Basic Compiler runs on these systems and the 3000, and costs £75. Portspeed, for the 64, generates object code for the 64 from a source on the 8000 series, for £125. X-64 is a cross-compiling version of the Integer Basic Compiler, generating machine code on the 8000 for execution on the 64; the price is £125. B-Port takes source code from the 8000 to run on the new 7000 series, for £450.

Olivetti: A viewdata package for the M20 is the latest software release from Olivetti (01-785 6666). Called Olitel, it costs £120.

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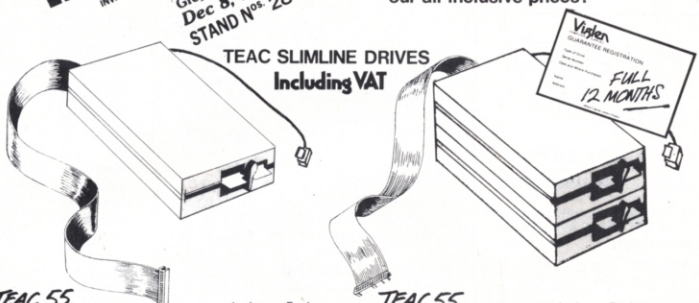

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PCN Charts

This top 30 games list is compiled from both independent and multiple sources across the nation. It reflects what's happening in high streets in the two weeks up to December 9 and, like the micro charts, does not take account of mail order sales. The micro charts this week show the number of machines sold in the same two-week period so they tell the story in the high street between November 26 and December 9.

GAMES

Top Thirty

			GAME TITLE	PUBLISHER	MACHINE	PRICE
▲	1	(5)	Atic Attack	Ultimate	Spectrum	£5.50
▼	2	(1)	Valhalla	Legend	Spectrum	£14.95
▼	3	(2)	Lunar Jetman	Ultimate	Spectrum	£5.50
▶	4	(4)	Ant Attack	Quicksilva	Spectrum	£6.95
▲	5	(9)	Splat!	Incentive	Spectrum	£5.50
▲	6	(30)	Metagalatic Llamas	Llamasoft	Vic-20*	£6.00
▲	7	(—)	Chequered Flag	Psion	Spectrum	£6.95
▼	8	(3)	Flight	Psion	Spectrum	£6.95
▼	9	(6)	Hobbit	Melbourne	Spectrum*	£14.95
▲	10	(28)	Pyramid	Fantasy	Spectrum	£5.50
▲	11	(13)	Horace & Spiders	Psion/Melb	Spectrum*	£6.95
▲	12	(14)	Chukkie Egg	A&F	Spectrum	£6.90
▼	13	(7)	Manic Miner	Bugbyte	Spectrum	£5.95
▲	14	(15)	Kong	Ocean	Spectrum	£5.90
▲	15	(29)	Hunter Killer	Protek	Spectrum	£7.05
▶	16	(16)	Computer War	Thorn/EMI	Vic-20*	£29.95
▼	17	(12)	Arcadia	Imagine	Spectrum*	£5.50
▲	18	(25)	Sheer Panic	Visions	Spectrum	£5.95
▼	19	(11)	Hovver Bovver	Llamasoft	C64	£7.50
▲	20	(—)	Mad Martha II	Mikrogen	Spectrum	£6.95
▼	21	(9)	Jet Pac	Ultimate	Spectrum*	£5.50
▼	22	(10)	Gridrunner	Llamasoft	C64*	£5.00
▲	23	(—)	Falcon Patrol	Virgin	C64	£7.00
▲	24	(—)	Bewitched	Imagine	Vic-20	£5.50
▼	25	(18)	Zzoom	Imagine	Spectrum	£5.50
▼	26	(23)	Hungry Horace	Psion/Melb	Spectrum*	£5.95
▼	27	(24)	Scrabble	Psion	Spectrum	£15.95
▼	28	(17)	Harrier Attack	Martech/Durell	Oric*	£6.95
▲	29	(—)	Wizard & Princess	Melbourne	Vic-20	£6.95
▼	30	(21)	Purple Turtles	Quicksilva	C64	£7.95

*Denotes available on other machines

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5. PSST	ULTIMATE	£4.50
6. ZZOOM	IMAGINE	£4.49
7. ZIP ZAP	IMAGINE	£4.49
8. ARCADIA	IMAGINE	£4.49
9. HALL OF THE THINGS	CRYSTAL	£6.50
10. ROMMELS REVENGE	CRYSTAL	£6.50
11. THE DUNGEON MASTER	CRYSTAL	£6.50
12. TRANS TOWER	RICHARD SHEPHERD	£5.25
13. DEVILS OF THE DEEP	RICHARD SHEPHERD	£5.25
14. KONG	OCEAN	£5.20
15. PENETRATOR	MELBOURNE HSE	£5.95

COMMODORE 64

1. KONG	ANIROG	£6.99
2. SCRAMBLE	ANIROG	£6.99
3. ATTACK OF MUTANT CAMELS	LLAMASOFT	£6.50
4. GRID RUNNER	LLAMASOFT	£6.50
5. HOOVER BOWER	LLAMASOFT	£6.50

VIC 20

1. METALLAMA'S	LLAMASOFT	£5.25
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PCN Charts

Neither mail order nor deposit-only orders are included in these listings. The prices quoted are for the no-frills models and include VAT. Information for the top-selling micros is culled from retailers and dealers throughout the country and, like the games, is updated every alternate week.

PCN Charts are compiled exclusively for us by MRIB (Computers), London, (01) 408 0250.

HARDWARE

Top Twenty up to £1,000

MODEL			PRICE	DISTRIBUTOR
▲	1 (2)	Spectrum	£99	(SI)
▼	2 (1)	CBM 64	£220	(CO)
►	3 (3)	BBC B	£399	(AC)
►	4 (4)	Vic 20	£140	(CO)
►	5 (5)	Oric 1	£99	(OR)
▲	6 (8)	Sinclair ZX/81	£45	(SI)
▼	7 (6)	Dragon 32	£170	(DD)
▲	8 (9)	Atari 800	£300	(AT)
▼	9 (7)	TI/994a	£90	(TI)
▲	10 (11)	Sharp MZ700	£240	(SH)
▲	11 (12)	Lynx 48/96	£225	(CA)
▼	12 (10)	Apple 11e	£750	(AP)
▲	13 (14)	Colour Genie	£168	(LO)
▼	14 (13)	Tandy Colour	£180	(TA)
►	15 (15)	Sharp MZ80A	£349	(SH)
▲	16 (—)	Atari 600XL	£160	(AT)
▲	17 (—)	Epson HX20	£472	(EP)
▲	18 (19)	Aquarius	£70	(MA)
▼	19 (18)	Newbrain A	£269	(GR)
►	20 (20)	Electron	£199	(AC)

Top Ten over £1,000

▲	1 (2)	IBM PC	£2,390	(IBM)
▼	2 (1)	ACT Sirius	£2,525	(ACT)
▲	3 (6)	Apricot	£1,719	(ACT)
►	4 (4)	Commodore 8000 series	£1,200	(CBM)
▼	5 (4)	Apple III	£2,780	(AP)
▲	6 (7)	Kaypro	£1,949	(CKC)
▲	7 (10)	Televideo TS-800 series	£1,495	(MD)
▼	8 (5)	HP86A	£1,570	(HP)
►	9 (9)	DEC Rainbow	£2,714	(DEC)
▼	10 (8)	Epson QX10	£1,995	(EP)

AC Acorn Computers. **ACT** — ACT. **AP** — Apple Computer. **AT** — Atari International. **BM** — British Micro. **CA** — Camputers. **CKC** — CK Computers. **CO** — Commodore. **DEC** — Digital. **DR** — Dragon Data. **EP** — Epson. **HP** — Hewlett Packard. **IBM** — IBM. **LO** — Lowe Electronics. **LL** — Lucas Logic. **MA** — Mattel. **MD** — MD Midlectron. **OL** — Olivetti. **OR** — Oric. **SH** — Sharp. **SI** — Sinclair. **SO** — Sord. **TA** — Tandy. **TI** — Texas Instruments.

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A booklet explains in detail that to move a drawing you need to tell the Graphics Subrougine where the drawing is in the memory, where an instruction sequence is, where you want the drawing to start on the screen, the length and height of the drawing, and the speed of movement. All this is done using *Basic* commands. The Graphics Subrougine occupies less than 760 bytes.

It moves a drawing by altering the area of memory containing the screen display. You do not even need to draw any pictures; you could just move whatever is already on the screen eg. text. The drawings that are moved are one colour (ink and paper). You can also use the Graphics Subrougine to draw and colour a stationary drawing. The time taken to draw and colour a picture which fills the entire screen is a 1:10 second.

A 3 × 3 characters drawing involves typing in 81 numbers and uses up 81 bytes.

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Computer education needs more thought

I was interested in your article on computing and education (Issue 38). I agree strongly with most of your conclusions, but am rather worried about the reference to machine-code graphics. Such specialised techniques have little to do with general computer education as do the lessons on punched cards and paper tape which seem to form part of the present curriculum.

We're in great danger of emulating the 'music' teaching current in my school-days when all the attention focused on the performers, with nothing done for those who could have been led to an intelligent appreciation of the pleasures of listening to music.

To devise a suitable course we need to think hard about the objectives of general computer education. This must be to enable the student to be, first, an intelligent *user* of computers. Only when this has been dealt with properly should we go on to programming. Here again we should concentrate on principles which will be of general applicability before encouraging the specialists to go on to advanced techniques. I have met several young programmers who knew many clever tricks for achieving special effects, but did not understand the need for designing programs. While those interested should certainly be encouraged to develop their skills, we must be careful not to give them the impression that most ordinary computing is like that.

I have often found computer science graduates make poor commercial programmers, largely because they want to

PCN £10 Star Letter

design operating systems and compilers rather than do unexciting, but necessary, work on payroll and accountancy.

If the GCE is to be considered as a qualification for a job we must remember that many school leavers will not have access to assemblers at work,

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and those who do will not be encouraged to write programs which cannot be maintained by anyone else. The organisation I work for will not allow the use of machine code programming, except in carefully controlled circumstances, because of the enormous problems of conversion as older microcomputers are replaced by new.

My ideal pupil claiming to have 'passed computer studies' would know:

- The difference, in computing terms between a mainframe and a micro *ie* why a ZX81 cannot run a power station.
- What a word processor is, and some of its less obvious uses.
- The uses of spreadsheet and mathematical modelling programs.
- The need for the *user* to specify the task for which the program is needed.
- The problems of data acquisition and reliability.
- The need for effective validation of input data, and for effective presentation of output data.
- The effect of file organisation on the performance of programs.
- The difference between random and sequential files, with the reasons for choice.

A pupil having 'done programming' would also know the importance of proper program design, maintainability, and the importance of understanding, and following, the specification supplied by the user. Also why different programming languages exist, and what affects choice of language.

This list could be much longer but I think that it could be a useful starting point for the debate.

David Wild,
Hemel Hempstead,
Herts.

Educational software rap wasn't fair

Bryan Skinner's article (Issue 38) made a lot of sweeping generalisations that must be challenged.

Naturally the Government did not and would not, provide direction in terms of how micros were to be used in schools. How could they? It's a new technology applied in a new area. Teachers tackling it with scarce resources are to be admired. Their contribution will be far more effective and is far more demanding than writing articles for the popular press.

Mr Skinner makes little reference to the extensive use of micros in primary and middle schools, where cross curricular applications can easily be found. Kenneth Baker, Minister for Information and Technology, is quite right to claim that Britain leads the world in educational software. The quality of such software from other countries is generally poor. That of British origin, either MEP, or from commercial publishers — is improving dramatically all the time.

One problem faced by publishers is getting magazines to take educational software seriously. Happily *PCN* is beginning to lead the way. Until magazines begin to review more regularly, and schools can find the funds to purchase rather than pirate, growth will be slow.

Most publishers would not agree with the comments on current releases. All our releases have been devised, programmed and used by practising teachers for their classrooms. They have a gut feeling about what to do with micros in their schools. That their products sell well illustrates that educational software need not be dull and boring.

Perhaps Mr Skinner would like to take a closer look at some of our products and those of other publishers?

Brian Kerslake
Joint Managing Director
Chalksoft, Worcester.

Bryan Skinner, PCN's software editor, is a former teacher, and is therefore fortunate to have practical knowledge of problems in schools. He'd certainly be interested in looking at more educational packages, so we can assess this area more regularly.
Ed.

A vital point for micro-buying families

Further to Micropaedia (Issue 39) on choosing a micro, one major, if not vital aspect of basis for choice is consistently omitted from advice articles.

This is that if you've got children at school either involved in — or going to be involved in — school computers, find what machines are compatible with those at school.

No point in developing programs on one micro at £100+ if these are not 'runnable' at school for futher practice or printing.

I would say for families this is the first item to be checked.

D Wright,
Leigh,
Lancs.

Good point, but surely any programming experience is useful and educational, regardless of machine — Ed.

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A micro for the literary man

Q I am a writer and have seen more and more of my colleagues becoming dedicated to their Apples and Tandys for word processing. At £4-5,000 I didn't have the cash or the output to justify the expenditure, but now someone has whispered seductive words like 'BBC B, with all the necessary bits and pieces, at about £1,200, will do everything you need.'

The computer centres I've visited are keen to sell me Osbornes, one offering it for £1,150 with a handful of software, including Wordstar. Another centre gave me a good demonstration of the BBC, but was hard pushed to give comparisons.

My inclination is to go for the BBC B with disk interface fitted at £469, a 12in monitor, disk drive and either a Juki or Brother HR15 printer. This would commit me to using Wordwise, but I've been told that Wordwise is not powerful and I should go for Wordstar.

Does the BBC package I suggest sound ok? Would Wordwise do all I want, or do I really need Wordstar? Can I use a single disk drive for copying my disks without it being too tedious?
John Hines,
Gwehelog, Gwent

A rs is a particularly interesting problem, because it's relevant to almost everyone who buys a cheap home micro. Once you've been using it for a bit, you start thinking about add-ons, and once you've totalled the cost of the system you want, you'll find you're talking about £1,000-1,200.

There's a justification for buying cheap and building up your system, but in your position, buying it all at once, you'll find yourself comparing a home micro with business systems, and you'll find the home micro, good machine as it is, doesn't really stand comparison with business systems at around the same price level.

The Osborne is certainly an option, and because of the company's recent troubles, you can get it a lot cheaper than you've been quoted. Or if you up your price level a little you could consider an IBM compatible.

Or what about looking at a portable? The Tandy 100 or the NEC will make for a cheapish centrepiece to your system, and you have the option of carting them around with you.

The BBC package you suggest does sound ok, and you could get it a little cheaper if you shopped around, and varied some of the ingredients. But if you don't want to play games, you could do a lot better. As for Wordwise, you're not chaining yourself to this system, but to several BBC systems. The difference is really in the power of the machines.

But don't be seduced by the word *power* — Wordstar is nice, but it's also complex, and you probably don't need all its facilities.

And yes, it is tedious using only one drive, but again you can get by, and you can always buy another later.

So the moral of the tale is that there is a bottom line price for a complete working WP system, and therefore you shouldn't confine yourself to home systems that only start cheap.

Spectrum mania knows no age barrier

Q Can you suggest a supplier of a disk drive, O/S and interface for my 48K Spectrum? I have an Epson FX80, Tasman Centronics interface, ZX Printer, Dean keyboard, custom-made console, TV, tape recorder and a library of Spectrum books and software, including Tasword 2, business accounts, club records, chess and a number of home made programs.

I'm a recently hooked novice but, as I am 76 years old, I need to save time on searching, loading and saving. I don't wish to acquire a more elaborate computer until I've mastered this one, by which time I'll probably be old enough to know better.

Retailers suggest waiting for the Microdrives, but by then I shall be 90. Besides, I'm sick of all that soggy string.
John Willsmer,
Edenbridge, Kent

A A few weeks ago it would have been difficult to help you, but there are currently two disk systems you may want to look at. The Viscount disk system is available through the Spectrum chain of computer shops, and is a 100K single sided double density 5.25in disk system specifically for the Spectrum. It costs £245. The Byte Drive 500 isn't ready for the Spectrum yet, but is expected.

The latter's specifications are better, but we'll be testing both in the next couple of weeks, so you can judge from that.

Normally, you would have to worry about a DOS if you were buying disk drives, but there are currently so few disk systems about for the Spectrum that you'll find this is included. Interfaces will also be part of the package.

But it might be worth your while to hang on a couple of months until the smoke clears. A disk system seems to be the next step for the low-end micro, and it could be there'll be a lot more out over the next few months.

The legal side of the software business

Q I'm in the middle of making a hunchback game for my Oric, and when it's finished I want to sell it on cassette. It has most of the things the original has, and I would call it Hunchy.

Would I need to pay any copyrights for the game and or the name I give it? Do I need a licence to sell my games?
M Hibbert,
Denton, Manchester

A The situation regarding copyright is rather murky. The copyright laws predate, to all intents and purposes, the existence of commercial software, so even if you do hold copyright of a piece of software you'd still have to show that it fell into one of the artistic categories covered by the current legislation.

If you think of software in terms of artistic output then you shouldn't have to apply for copyright — you hold it as soon as you've produced it. In the case of an infringement, of course, you'd still have to prove this in court. It's also safe to assume that the name Hunchy has made a few appearances already, so there's no way you could copyright it.

Now let's take a look at your position. You're proposing to sell a game by mail, and the business being what it is, if the game is any good it'll get ripped off. Legally, if your copyright is being infringed, you'd have to take action against whoever is infringing it, and you almost certainly can't afford it.

So your only course is to use the sabre-rattling approach much favoured by software houses. Once you've got the game finished, send it out to a few magazines for review so it's well known you've produced it. Then you've got to monitor any mail order games you see advertised and — shudder — buy any suspects.

Then you send a stiff letter to the perpetrator and contact the advertising manager of any magazine advertising it. You can stop it being advertised, and you may even wring a confession out of the culprit, but as you can see, it's only an exercise in damage control, and it's a very large hassle.

If your game is any good it will make money, but it'll need investment to make a significant amount. So either you raise the finance yourself, and set up a software house with the resources to protect your copyright, or you contact a software house and get it sold that way.

Casio conversion — not a DIY job

Q Could you tell me whether it is possible to convert a Casio 601-p to a Casio 602-p? The calculators seem exactly the same, except for the memory capacity and number of memory stores available. There's even space allocated for another chip in the casing.
R Willis,
Fairwater, Cardiff

A Yes, it can be done, but Casio says it wouldn't be feasible to do it yourself. Contact Mr Danjean, Casio Electronics, Unit 6, 1,000 North Circular Road, London NW2 7JD — it should cost around £13.

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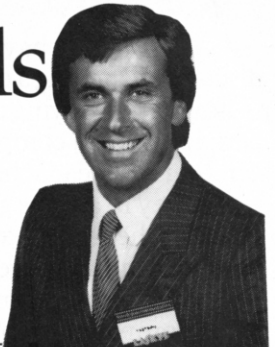

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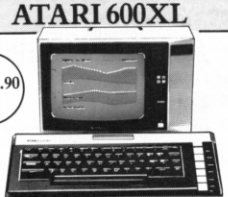

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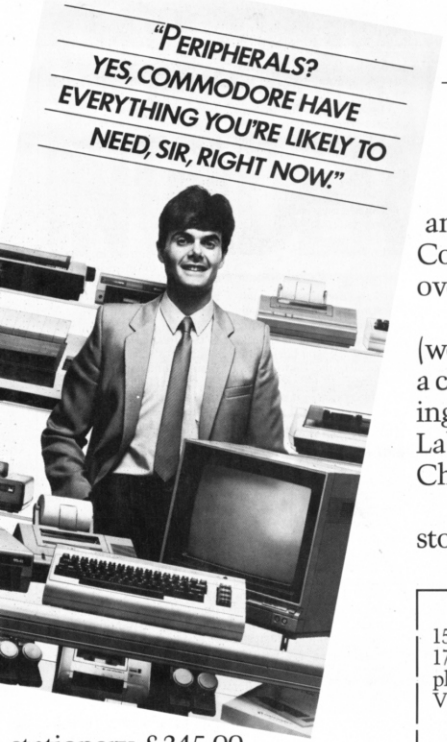

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A-Z of Lynx numeric variables

The Lynx is limited on the number of numeric variables that you can use: only A-Z and a-z (although more can be found by using numeric arrays). When developing long programs it is useful to know which variables have been used. This short program will list them:

```
100 CLS
110 PRINT "NUMERIC
    VARIABLES USED:"
120 LET Z=64
130 FOR Y=1 TO 52
140 IF Y > 26 THEN LET Z=70
150 IF PEEK (&6707+5*Y)<>0
    AND PEEK (&6707+5*Y)<>
    &FF THEN GOTO 170
160 ELSE GOTO 180
170 PRINT CHR$ (Z+Y),
180 NEXT Y
```

With the Lynx, variables are held in a table starting at &6707 as 5 byte binary coded decimals in alphabetical order. Line 150 searches the table in 5 byte steps. If the first byte is not &00 or &FF then the 5 byte location contains a variable. The ',' in line 170 formats the list into 5 columns.

The program can be renumbered from, say, 10000 and appended to an existing program. It can be called up using GOTO 10000. Note that Y and Z will be listed since they are used in this program. A modication to this program could be added to list, say, the string variables as well.

One drawback to this is if, for example, you type 10 A=0, and subsequently 10 B=0, deleting any mention of A, then A will remain in the variable list when you run the program above.

If you have a way to avoid this, please send your Microwave to *PCN!*

Bob Towers,
Hamilton, Strathclyde.

Quicker editing for the Oric

The Oric manual doesn't really say how to use the editing functions to their full potential. The editing procedure is like that of the Apple.

To begin with, you don't have to retype a line if you want to insert a space or other characters. EDIT or LIST the line you want to change, then run the cursor along the line, using CONTROL-A as usual, to the point where you want to insert characters. Then use either the up or down arrows to move the cursor off the line itself.

Now type the characters to be inserted. When you have done this, use the up/down and left/right arrows to move the cursor back to the point on the original line where you left off copying. You can now use CONTROL-A to copy the rest of the line into the keyboard buffer, before sending the whole lot to the Oric with ENTER.

If you want to renumber a lot of lines, you can use address 775 (which controls the key repeat delay) to speed up the process. POKE 775,10 before moving the cursor. You'll find the cursor really zips across the screen, which is great for copying long lines. This does, however, slow down all other functions on the Oric, so when you've done, POKE 775,39 (39 is the normal value in 775).

You might like to know that POKEing 775 with large values like 100 will speed up your Basic programs by up to 20 per cent, but will slow down the key repeat function enormously.

H G Bennett,
Worle, Avon.

Stringing the Dragon along

There is a useful string manipulation statement on the Dragon called MID$, as well as the function of the same name. This statement has the following syntax:

MID$ (ST$,P,L) = SUBST$

This replaces the first L characters of the string SUBST$ at position P in the string ST$. If L happens to be greater than the number of characters in SUBST$, or if it is left out altogether, then the whole of SUBST$ is inserted. The resultant string, ST$, always retains its original length, irrespective of the length of the substring, so be careful.

The following routine replaces all the spaces in the string A$ with the '/' character, and was developed for use with the Dragon Data voice synthesiser.

```
10 REM REPLACE " " with "/"
20 REM T. BRIDGE 1983.
30 CLS:LINE INPUT A$
40 P=INSTR(1,A$," ")
50 IF P=0 THEN 80
60 MID$ (A$,P,1)="/"
70 GOTO 40
80 PRINT A$
```

It's also useful in manipulating strings for the PLAY and DRAW commands, for example in producing mirror images of a DRAWN shape, you can use it to change all of the 'L's to 'R's.

T Bridge,
Manchester M8.

BBC bytes high and low

One problem with the BBC operating system is that it allows you to access things using only one byte at a time. You can't reach a particular point on the screen in graphics modes, because the addresses are likely to be greater than 255. Split each address into two parts, and call them the high byte and the low byte and you can reach points as follows: (This program plots a point at 880,610 in mode 2)

```
10 MODE 2: VDU 5
20 P%=&E00
30 PROCAS
40 CALL &E00: VDU 13: END
50 DEFPROCAS
60 [OPT 0]
70 LDA #25: JSR &FFEE
80 LDA #69: JSR &FFEE
90 LDA #115: JSR &FFEE
100 LDA #3: JSR &FFEE
110 LDA #100: JSR &FFEE
120 LDA #2: JSR &FFEE
130 RTS:]
140 ENDPROC
```

The 69 in line 80 is taken as a PLOT69 statement. The computer then multiplies 3 by 255 and adds 115 to it, giving 880. In the second part, 2 is multiplied by 255 and 100 is added to the result, giving 610.

Changing the 69 in line 80 changes the PLOT statement, eg 85 gives a line plot. See pages 319 to 321 in the User Guide for more information on the PLOT statement. The VDU 13 in line 40 returns the program to the next line for neatness.

Andrew Thomas,
Marlow, Bucks.

Instant Spectrum pictures

Often a picture can take a long time to draw on the screen. Here is a short program for the 48K Spectrum which enables you to store the picture in a different part of the memory and recall it instantly.

First draw the screen that you wish to save, then use this program to store it in another location of the memory.

```
10 FOR F=32738 TO 32749
20 READ A
30 POKE F,A
40 NEXT F
50 DATA 17,0,220,33,0,64,1,
   0,27,237,176,201
60 REM Put the picture
   drawing routine here.
90 RANDOMISE USR 32738
```

To recall the picture use the same program, but change the data in line 50 to:

```
50 DATA 17,0,64,33,
   0,220,1,0,27,237,176,201
```

To save the picture onto tape, use SAVE"name" CODE 56320,6912.

To load the picture from tape use LOAD instead of SAVE.

To use this in a program, use the original program and to recall the screen POKE 32740,64:POKE 32743,220 and use RANDOMISE USR 32738, whenever you want the picture to reappear.

Piotr Lukaszuk,
Safat Kuwait, Middle East.

Breaking into Spectrum programs

This tip, for Spectrum owners, may be a useful method of breaking into programs. It is an alternative to caps shift and Break. Just press Caps Shift, V, B all at the same time.

Paul Charles,
Nottingham.

Scrolling the BBC screen

One interesting BBC command for screen manipulation is a variation on the VDU23 command:

VDU23;8199;0;0;0;

This causes continuous scrolling of the screen in an upward direction. It has to go at the very beginning of the program, and the scroll can be stopped by pressing the break key.

Philip Galen,
Hornchurch, Essex.

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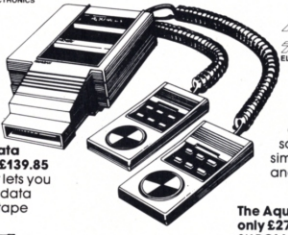

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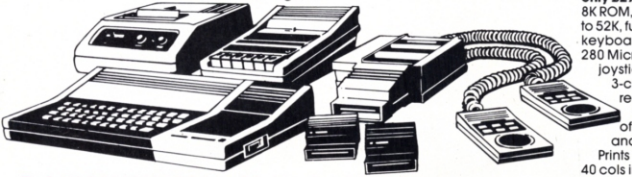

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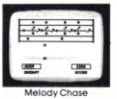

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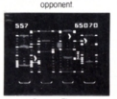
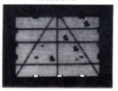
Snafu
Little lines that grow – and trap you.



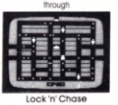
Burger Time
Make burgers, avoid hot dogs and pickles.



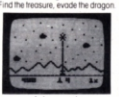
TRON Deadly Discs
Help the Walt Disney hero win through.

Advanced Dungeon and Dragons
Find the treasure, evade the dragon.

Night Stalker
On the run from robots in the maze.



Lock 'n' Chase
Rob the bank, dodge the cops.



Astrosmash
Falling rocks, bombs, missiles and UFO's.

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While new micros come and go, the Apple marches on. Richard King looks at the current model.

Apple revisited

The focus of High Technology is usually fixed on the different, the innovative and the new. The converse — the familiar, the tried and true and the old, rarely gets an airing in the pages of magazines like *Personal Computer News*.

We make no apologies for this approach. As our title suggests 'News' must come first. On the other hand we should find space for the old, familiar, tried and true amongst the latest 'whizz-bang' products if we are to fulfill our editorial goal of providing 'tools for users'.

Just about every week *PCN* hails the arrival of cheaper computers with more memory and features. Every week somebody somewhere has made a technological breakthrough which has the potential to put more power under the fingers of the computer-using public. And so it goes on — innovation piled upon innovation, price drop un-piled from price drop.

But, every week, seemingly unaware of all this activity, several thousand people each buy a seven year old Apple II computer — not only this, they pay vast sums for it.

Why? Because Apple II computers are familiar, tried and true and old, and in computing each one of these slightly derogatory descriptions should score bonus points.

Familiar is a bonus because it means that a lot of people have had Apples for a long time.

Tried and true speaks for itself. The Apple II does the things it's supposed to do. It doesn't suddenly develop insoluble bugs in its operating system, or have to be recalled for a chip change.

Old, ironically, scores the most points, because the old Apple has been around long enough to accumulate a stunning collection of applications software and literally thousands of add-on and add-in peripherals. 99 per cent of this bumper harvest comes, not from Apple Corporation but from the ubiquitous third party entrepreneurs. Seven years gives even the most perfectionist hardware or software developer time to freeze a design and get the product into the shops. It even allows him time to bring out the Mark Two, Three or even Four versions.

Apple has recently announced a special Starter Pack for its ageing baby which these days, for appearances sake, goes under it's grown-up name of Apple IIe. We thought this gave us the excuse we needed. We gave the Starter Pack to confirmed Applephile, Richard King and told him to tell us why Apple has the gall to sell a 48K computer with one disk drive, no monitor and no colour, for £995.

It's old, nobody can deny that, but for some reason it just won't die. Of course, the Apple recently had a facelift and a bit of a rebuild, but in many ways it's very much the machine as it first appeared. The actual hardware has changed extensively and now there's the imminent release of the very superior operating system.

Although owners of Apple IIs may not agree, operationally the versions are much the same.

So why does it continue to be very popular? Faced with competition from huge pseudo-16 bitters, lots of big 40-pin chips inside and impressive specifications (at least on paper), why should a design based on a 8-bit CPU clocked at a modest 1MHz be considered a serious alternative?

Running CP/M on the Apple couldn't be simpler. Well, no simpler than CP/M ever is, anyway. All the Input and Output is handled by the 6502 CPU on the main board, with the Z80 running everything above that from the BIOS (Basic I/O System) to your MBasic programs. The two pass messages back and forth, but they do it so fast that you'd never normally notice it.

The boot program on the CP/M system master disk, which is written in 6502 machine code, is set up so that it looks at all the slots when it starts up, and if it recognises an 80-column card in Slot Three, then it will come up using that, rather than the 40-column screen.

The problem is that it tries to make the 40-column screen into twice the width, and it does it by scrolling the screen sideways whenever you type up to the right-hand edge. This is a good try, and does the job, but it's so disconcerting that you'd do better without.

The USCD p-System does the same whenever no 80-column card is available, and the same comments apply.

The library of programs available under CP/M and in the Apple disk format was rather limited at first, but now that the Apple is recognised as a regular CP/M machine, the supply has expanded, and is now as large as any other, except perhaps Distribution Format. Of course, with the better integrated communications facilities of CP/M, in the form of PIP to a COM: device, it's not impossible to transfer material from another machine to the Apple.

The power of such a system is perhaps best exemplified by some of the communications programs available for a CP/M-Apple, which are among the most advanced in the world, able to send or receive multiple messages at chosen times.

Certainly, the ability to run a complete CP/M system has been a major contribution to the Apple's long life.

Nobody can deny that many potential micro-users, when picking a machine for themselves finally plump for the Apple. There are several reasons. First, the flexibility provided by the expansion-slots has resulted in not just one or six different models of the Apple, but millions. Some of these aren't even made by Apple, such as the Basis 108 and Franklin, but work just like one. Every one is unique, and as much a reflection of how its owner habitually uses it as it is of the basic design.

Each owner moulds his machine by adding boards from the enormous range of extras, many of which are well-exploited by the even bigger range of software. The full directory of this little lot claims 4,600 entries, which is considerably larger than for any other machine.

The second reason is a direct result of the first, since one of the most common add-on cards is one of the dozen-or-so Z80 cards. Putting in one of these gives access to the second largest software library in the world, CP/M, the biggest being Apple's own. The fact that it's quite slow doesn't seem to make a lot of difference to its users . . . it's fast enough.

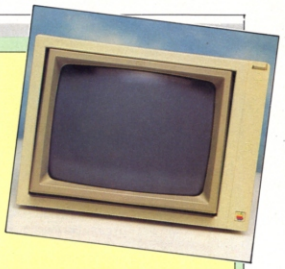
Pack offer

It does need a little promotion, however, and Apple has decided to offer 'The Apple Professional Home Computer Pack' for £995. This consists of an Apple IIe, a single disk drive and controller-card and a TV sound and colour modulation card. Also included are vouchers giving a £25 rebate on both a selection of software and hardware items, £68 for a Prestel system and £100 for a one-day training course, plus a back issue of a magazine, promotional literature from dealers, glossy in-house pamphlets and a special Apple sports-bag.

For review purposes we had a more complete system, with a second disk drive which plugs into the same controller card as the first, an Apple Monitor II and software which included Apple Writer II and Quick File II, Apple Logo and four games/educational packages. The basic package is usable as it arrives, provided you have a television.

On the heels of the Apple IIe, the company finally released its own, monitor, specifically intended for use with the machine. Previously Apple's only screen was Monitor III, which has a long-persistence phosphor making it unsuitable for use with light-pens.

The new monitor is styled in the familiar way, moulded in an off-white colour, and complements the Apple well, being designed to sit on top of it. The on-off button is set in a recess at the top, and when it's pushed down, a yellow-green LED comes on, and there is a contrast control on the right hand side. Under the rather large protuberance in the back of the casing which houses the gun there are three more controls, vertical hold, brightness, and vertical divergence, which allows you to s-t-r-e-t-c-h the screen top to bottom or squash it down. It's unusual to have a swivelling screen inside a static housing, but this isn't as much use as one might think, with a five-degree upward tilt, and 10-degrees down. I found that it stayed fully uptilted.



In use, the screen was beautifully crisp and steady, though a miniscule amount of jitter could be seen with peripheral vision. My only complaint, is that the whole image was shifted sideways by quite a noticeable degree. I imagine that there must be some minor adjustment which will correct this, but I couldn't find it, not even at the bottom of the little holes in the back, which is where such controls are often found.

Starter pack

The best way to evaluate the suitability of the 'starter pack' was to find a starter, and get him to set it up with no assistance beyond that in the manuals. Of course, picking your starter is important, and the

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Close encounter of the first kind

The boxes were the first shock. Every computer I'd ever seen had sat neat and blinking on a desk or counter, all set up and ready to go. But here I was about to collect an Apple IIe, complete with monitor, two disk drives and a daisy-wheel printer, and all I could see were boxes.

I'd bought Apple because it had been around, and even I had read about Californian sunshine, and the fortunes made by founders Jobs and Wozniak. This was to be my slice of Silicon valley, made for me by the people who know. But on the box it said: 'Assembled in Ireland'. Something quite different.

Still it prepared me for what was to come. 'Open this end' said the label, so I did, and peered inside. The machine was upside down. Panic! All the bits will fall out.

But they didn't. Nothing fell out. In fact nothing moved. I pulled and tugged, and nothing moved. I opened the other end and pushed. My friend pulled and it slipped, not much, but enough. The box had been breeched, the carton cracked, and after the first two inches it was easy enough.

I had asked the lad in the shop — one of those demoralisingly young fresh-faced 17 year olds, who turned out, having sapped my confidence, to be the despatch clerk — if there was a manual inside. He just grinned. Now I knew why. Buy in bulk like I did, and the manuals add up to a foot-high stack. Who said computers removed the need for paper?

But worse was to come. The manuals were acceptable. What I hadn't anticipated was the do-it-yourself Meccano kit, and the instruction . . . on page 13 of the first book — Genesis it should be called . . . to take the top off the machine.

I had believed them when they said a computer was like a friend. How many dinners have you had where your friend asks for a quick liver transplant? Mind you, poking round inside the Apple was straightforward enough if you are not all thumbs, though it would have been easier if it had been explained why certain moves were necessary rather than simply telling you to do them.

Enough of that. Back to safer ground. Check the contents it said, and make sure everything is there. But being totally ignorant I did not know my 'Disk II Interface Card for 16 Sector' from my 'Diskette: DOS 3.3 System Master' or my 'M.O. Form, User Input Report'.

Perhaps it was all there. Perhaps it doesn't matter . . . No doubt I'll find out in time.

Anthony Hilton

Second opinion

Apple DOSsier

At the price of £1,000 for the basic machine, the Apple can't be considered as just a fun thing to have around the house. It will probably have to serve some useful purpose, so what can you do with it, and in particular, of all the available options open, especially the Operating System, what should be chosen, and why?

Quite probably, a potential purchaser will want to run some small business on it, in which case the CP/M capabilities of the system are a favourite, or perhaps the UCSD Pascal system, which are favoured for writing accounting suites.

Apple DOS 3.3 is the 'natural' operating system for the Apple, and the majority of software runs under it. It's supplied with this package. In general it is easier to use, especially with Basic. It will run other languages, but not as well, which is why Apple has developed a new operating system, ProDOS, which has features often only found on very much larger machines with price tags containing many zeros. It is designed specifically to make it easier to handle the various hardware and software products which are available.

ProDOS will also make the process of integrating them all into a unified system a practical proposition.

ease of the task will depend on his experience.

The guinea-pig was familiar with stereos, video-systems and car electrics. He managed the job in about an hour and a quarter, after spending an hour reading accompanying manuals. He's played a few games on an Apple before, but had never been so close to the insides.

Expansion slots

The Apple may arrive with a modest 64K of RAM, one disk drive and not much else, but it generally doesn't remain that way for long. There's many a machine running half a Megabyte or more of memory, two or even three processors, a couple of printers, modems and so on, proving that the machine is capable of serving as a basis for a serious computing system.

This is all achieved by plugging extra

A small portion of chips, but the Apple IIe has lots of space for add-on Apple cards courtesy of the "third party" peripheral manufacturers.

boards into the system expansion slots. Since there are only seven of them, the contents have to be chosen carefully from the wide range available. In particular, Slot One is for the parallel printer, Three is dedicated to display terminals, and Six must have a disk drive controller card. Slot Seven is often used for colour-cards, and the CP/M card with the necessary Z80 processor generally goes in Slot Two or Four, since Slot Five is the default location for the second disk drive controller, if it's fitted.

The most common configuration for a well-developed setup is:

1 Parallel printer card
2 Uncommitted, but usually a large memory-expansion card, 128K or more
3 80-column card or serial card driving an external terminal
4 Uncommitted, but often a Z80 card for CP/M use
5 Again uncommitted, but recognised as the second disk controller
6 Disk drive controller card

Such a system as this represents a considerable investment. You can go still further, as always, at a price, and there's so much software available that you couldn't want more. Hence the reason for the continuing appeal of the Apple.

The slots are seen by the CPU as part of the memory, and since each area may also be seen as 2K of ROM as well, control-programs may be put on each card, which makes them easy to use.

Verdict

As a package, the Apple Professional Home Computer Starter Pack isn't much of a bargain . . . it's possible to find discounts whch will bring the price close, and second-source disk drives, which are very much cheaper, will equal it. Apart from the coupon for the monitor, most of the other vouchers aren't all that interesting, so unless you are desperate for the sports-bag or can't be bothered to run about looking for a good deal, it should be looked on as just a bit of Christmas glitter. Of course . . . it *is* an Apple, and that's more than most computers are.

Soft selection

Logo in any form has come to be something trendy, but Apple's version is different in that in many ways, this was what started it all.

As Logos go, it's pretty good, and far more versatile than people think. Unfortunately, the sheer seductiveness of the graphics is such that few people except Seymour Papert seem to have done anything other than make very elegant but singularly useless doodles with the language. Of course, it's often talked about as a better way to teach children about computers, and so it would be, but for those doodles.

As it is, Logo seems to be responsible for an awful lot of kids who know how to make amazing designs, but nothing about list-handling or decision-making, areas in which Logo is as good, if not better than most languages.

The reason is probably to be found in the two manuals which accompany the disks. One is a normal reference manual, complete and well presented, and the other is an introduction to programming using turtle-graphics. Unfortunately, this book just doesn't go far enough . . . in particular, such decisions as are shown in the examples are pretty trivial, and give no clues about the real utility of logical evaluations. The other omission is the complete absence of any list-handling at all.

It's just as useful to process a list in a graphics application as it is elsewhere, and possibly even more so. No only that, but the ability to handle the program which is running as a piece of data could lead to some even better doodles, if that's still the major preoccupation.

There are other versions of Logo on the Apple, and these comments apply to them, too, but any of them are worth looking seriously at. . . just remember, it can do a lot more than scribble!

Apple's evident belief that Apple Writer is among the best text-editors in the world is not one I share . . . I don't know many others who do.

It's so peculiar, with many tricks and clever extras. The behaviour of the arrow-keys is perhaps the most idiosyncratic, with a totally unique method of copying characters incorporated in the back-arrow. This stores everything as a LIFO (Last In, First Out) stack in its annoyingly-small buffer. The result is a system which is unlike any other.

Another feature which I find useless is the Word Processing Language (WPL), which supposedly allows form-letters and such to be handled as batches. I say supposedly, since I've never met anyone who found it possible to do much with programs which are limited in size to 2048 bytes.

A good form-letter package should be able to handle at least ten variable items per form, and many can handle up to some silly number like 65535 different items per form.

WPL also has the disadvantage that all its commands are two or three letters long, and many don't have much mnemonic value.

As if to prove how inconsistent software with a brand-name can be, Quick File II is as pleasing and sensible to use as Apple Writer II is odd. It's Pascal 1.1 based, which means it's quick off the mark on disk-accesses, but for the same reason, data cannot be read or written to DOS 3.3 disks, which is what Apple Writer II uses.

On its own, Quick File is as useful as any other card-index program, and better than many. It's good to see multiple records available for display on one screen, and little extras like variable column-widths make things much easier. Report formats can handle calculations either within a record or on individual fields in each record, but perhaps to prevent people complaining that it works on a different system from the text editor, will send reports only to the printer. There is no provision for putting them on disk, for later editing or formatting.

SPECIFICATION

Price	£995
Keyboard	Typewriter-style, 58 keys
Processor	6502
RAM	64K
ROM	16K
Text Screen	40×24/80×24
Graphics screen	280×192/560×192
Storage	One disk drive 143K, 35 tracks, plus cassette interface
Interfaces	Games I/O port, 7 expansion slots
Language	AppleSoft Basic
Distributor	Apple Computer UK

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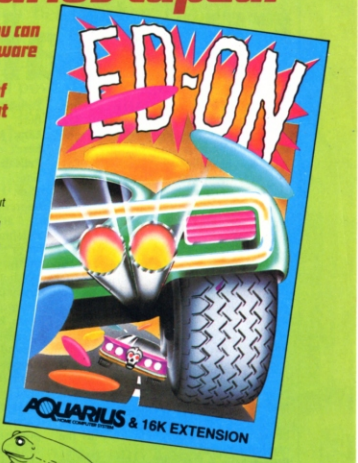
'N' Vaders

The classic arcade golden oldie but written in machine code for fast, exciting action. Pit your wits and skills against squadrons of coloured weirdos. Blast them all from the sky – but beware, they get faster and meaner.

Ed'on

Eat the dots and avoid the planes to win through. An updated version of the addictive arcade game. Accelerate, decelerate, dodge and change lanes. If you manage to avoid destruction you go on to higher things.



JUST RELEASED

Phrogger

A leap in front of all other versions – an arcade quality game with truly amazing graphics. Hop, skip and jump across all the dangers and perils. Take your life in your controls to reach safety.

Aliens

You are one of the chosen 'Gatherers' selected by your unique abilities and talents. Probe the mysteries of the 'past times' building. Gather the secrets of the Universe. Have you the mental strength to survive and the character to win?

Chuckman

Based on the ever-popular arcade game with extra extras. Find the quickest route, avoid the meanies and defuse the time bombs to win the day. But beware, this game is addictive, you'll risk sleep and peace of mind.

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Are you fed up with having no one to talk to? Tom Sato gives the BBC micro the gift of the gab.

Eliza talks back

Artificial Intelligence (AI) is currently something of a buzz subject. The Japanese are working on fifth generation AI computers, and the work at the Artificial Intelligence Lab at Massachusetts Institute of Technology has been very much in the public eye.

It seems that every time artificial intelligence is mentioned on television or in magazines, the Eliza program crops up. Eliza was written in Lisp in 1966 by an AI pioneer at MIT, Joseph Weizenbaum. He composed a program with which one could 'converse' in English and named it Eliza after the heroine of Bernard Shaw's play 'Pygmalion'.

Because the conversation must be about something, Weizenbaum designed it to play the role of a Rogerian psychotherapist. Its technique consists of drawing patients out by reflecting their statements back to them.

Here is an often quoted conversation between a young lady and Eliza as the psychotherapist:

Patient: Men are all alike.
Eliza: In what way?
Patient: They are always bugging us about something or other.
Eliza: Can you think of a specific example?
Patient: Well, my boyfriend made me come here.
Eliza: Your boyfriend made you come here?
Patient: He says I am depressed much of the time.
Eliza: I am sorry to hear that you are depressed.
. . . and so on. Eliza will 'talk' to you indefinitely without ever making a diagnosis or giving you practical advice. This is pretty much the same for Rogerian psychotherapists. They believe that by repeating patients' remarks back in a clear form, they can clarify them and make them 'know themselves'.

The Eliza program became famous around the world because, unlike data processing programs in obscure branches of mathematics, Eliza could be appreciated by practically anyone.

As it became widely available Weizenbaum was shocked to find that some practising psychiatrists seriously believed the Eliza program could be enhanced for clinical use! He was also startled to see how quickly people became emotionally involved with the computer. He says in his book *Computer Power and Human Reason*:

'Once my secretary, who had watched me work on the program for many months and therefore surely knew it [Eliza] to be merely a computer program, started conversing with it. After only a few interchanges with it, she asked me to leave the room. Another time I suggested I might rig the system so that I could examine all conversations anyone had had with it, say overnight. I was promptly bombarded with accusations that what I proposed amounted to spying on people's most intimate thoughts; clear evidence that people were conversing with the computer as if it were a person who could be appropriately and usefully addressed in intimate terms.'

The Eliza program is now available for micros such as the Apple and Pet. Its technique is much copied, especially in the field of adventure field programming.

Two graduates from MIT formed a company called Inforcom, which sells an exceptionally complicated adventure called Zork. It also sells an adventure in which one plays the role of a detective. The program, Deadline, incorporates an Eliza-style conversation technique so that the player can talk to various characters in the game. One can, for instance, say

25 ▶

```
  10PRINT"  BASICALLY ELIZA....."
  20PROCINIT
  30INPUT S$
  40TX=FALSE:DX=FALSE
  50RESTORE 490:IF FAMILY$="" THEN FAMI
LY$=FNREP("FAMILY")
  60RESTORE 500:IF SAD$="" THEN SAD$=FN
REP("SAD")
  70RESTORE 510:IF HAPPY$="" THEN HAPPY
$=FNREP("HAPPY")
  80 PROCCHANGE:AX=FNKEY:PROCSWEARING
  90IF AX=0 THEN 150
 100IF AX>22 THEN GOTO130
 110ON AX GOSUB670,690,710,750,770,800,
820,860,880,900,990,950,1040,1060,1080,1
100,1120,1140,1160,1190,1210,1280,1350,1
420,1440
 120IF TX=TRUE THEN TX=FALSE:GOTO90
 130IF DX=FALSE THEN ON AX-22 GOSUB1880
,1440,1420,1350,1940,1960,1980,2010,2030
 140IF TX=TRUE THEN TX=FALSE:GOTO90
 150IF DX=FALSE THEN PROCFLANNEL
 160GOTO30
 170REM******************
 180DEF FNIN(X$,Y$):IF LEN(X$)<LEN(Y$)
THEN =FALSE
 190=INSTR(X$,Y$)
 200DEF FNIN2(X$,Y$,B%):IF LEN(X$)<LEN(
Y$) THEN = FALSE
 210=INSTR(X$,Y$,B%)
 220DEF FNINF(Y$)=FNIN(F$,Y$)
 230DEF FNA(A$)=RIGHT$(F$,LEN(F$)-FNINF
(A$)-LEN(A$)+1)
 240DEFPROCP(J$):PRINTJ$:DX=TRUE:ENDPRO
C
 250DEF PROCCHANGE:S$=" "+S$+" ":AX=0:F
$=""
 260REPEAT
 270CX=FNIN2(S$," ",AX+1):W$=MID$(S$,AX
,CX-AX+1):AX=CX
 280RESTORE 360
 290REPEAT:READ A$,B$
 300A$=" "+A$+" ":B$=" "+B$+" "
 310UNTIL A$=W$ OR A$=" 1234 "
 320IF A$=W$ THEN W$=B$
 330F$=F$+LEFT$(W$,LEN(W$)-1)
 340UNTIL AX>=LEN(S$)
 350F$=F$+" ":ENDPROC
 360DATA YOU,I,I,YOU,AM,ARE,ARE,AM,DONT
,DON'T
 370DATA CANNOT,CAN'T,CANT,CAN'T,WAS,WE
RE
 380DATA WERE,WAS,YOUR,MY,MY,YOUR,ME,YO
U
 390DATA YOURSELF,MYSELF,MYSELF,YOURSEL
F,HOW,WHAT
 400DATA COMPUTER,MACHINE,COMPUTERS,MAC
HINE,MACHINES,MACHINE
 410DATA SAME,ALIKE,DREAMED,DREAMT,NO-O
NE,NOONE,NOBODY,NOONE
 420DATA EVERYBODY,EVERYONE,PERHAPS,MAY
BE,1234,X
 430DEF FNREP(Y$):Z$="":AX=FALSE
 440FOR I%=1 TO 4:READ A$
 450IF FNIN(S$," "+A$)>0 THEN Z$=A$:AX=TR
UE
 460NEXT
 470IF AX=TRUE THEN S$=FNSWOP(S$,Y$,Z$)
 480=Z$
 490DATA MOTHER,FATHER,SISTER,BROTHER
```

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'McNabb, tell me about the murder.'

The Eliza program has been traditionally written in Lisp, the artificial intelligence language. Lisp is very well structured and can handle text data in a more sophisticated manner than Basic. But Lisp is a difficult language to learn.

But there is nothing to stop you writing an Eliza program in Basic. My version is an adaptation of a microcomputer version of Eliza written in Lisp, and runs on the BBC B. I have limited the length of the program to about 10K, so this version of Eliza is limited, although just as much fun to play. The best way to improve it is for you to try it out and find its weakness. Then you can add more subroutines to overcome its shortcomings.

Eliza works by looking up key words in the sentence input by the user. Then it goes to the subroutine for the keyword found. The subroutine then either prints out a reply or looks for further keywords. The program is rather complex because I have used procedures and functions to save memory.

Here is a listing of all the procedures and functions with their explanations.

PROCINIT Initialisation procedure. It defines most of the variables needed such as FAMILY$ and MEMORY$. These variables serves as Eliza's memory of your input.

FNREP This function checks to see if important keywords such as MOTHER, FATHER, DEPRESSED have been

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```
  500DATA SAD,DEPRESSED,UNHAPPY,SICK
  510DATA HAPPY,ELATED,GLAD,BETTER
  520DEFPROCANKEY(Q$):F$=FNSWOP(F$," VWZ
X",Q$):A%=FNKEY
  530F$=FNSWOP(F$,Q$," VWZX"):T%=TRUE:EN
DPROC
  540DEF FNSWOP(S$,Y$,Z$)
  550IF FNIN(S$,Z$) THEN =LEFT$(S$,FNIN(
S$,Z$)-1)+Y$+RIGHT$(S$,LEN(S$)-FNIN(S$,Z
$)-LEN(Z$)+1)
  560=S$
  570DEF FNKEY
  580A%=0:RESTORE 630
  590REPEAT
  600READ A$:A$=" "+A$+" ":A%=A%+1
  610UNTIL FNINF(A$) OR A$=" 123456 "
  620IF A$=" 123456 " THEN =0 ELSE =A%
  630DATA THANK,MACHINE,NAME,ALIKE,LIKE,
BYE,REMEMBER,DREAMS,DREAMT,IF,WAS
  640DATA WERE,NOONE,EVERYONE,ALWAYS,MAY
BE,SORRY,HELLO,NEVER
  650DATA WHAT,WHY,BECAUSE,YOUR,YOU,MY,I
,HE,SHE,THEY,YES,NO,123456
  660REM THANK
  670PROCP("THAT'S OK."):RETURN
  680REM MACHINES
  690PROCP("DO COMPUTERS WORRY YOU?"):RE
TURN
  700REM NAME
  710IF FNINF("YOUR NAME IS") THEN PROCP
("PLAESED TO MEET YOU"+FNA("YOUR NAME IS
")+". MY NAME IS ELIZA."):RETURN
  720IF FNINF("WHAT") AND FNINF("MY") TH
EN PROCP("MY NAME IS ELIZA."):RETURN
  730PROCP("I'M NOT INTERESTED IN NAMES.
"):RETURN
  740REM ALIKE
  750PROCP("IN WHAT WAY?"):RETURN
  760REM LIKE
  770IF FNINF("AM") OR FNINF("ARE") OR F
NINF("IS") OR FNINF("WAS") THEN PROCP("W
HAT DO YOU SUPPOSE THAT RESEMBLENCE MEAN
S ?"):RETURN
  780F$=FNSWOP(F$," LIKE "," LIKE "):PRO
CANKEY(" LIKE"):RETURN:REM PLEASE NOTE T
HE DIFFERENCE BETWEEN LIKE AND LIKE (IT
HAS SMALL L INSTEAD OF 'I')
  790REM GOOD BYE
  800PRINT"DO COME AGAIN.":END
  810REM REMEMBER
  820IF FNINF("YOU REMEMBER") THEN PROCP
("DOES THINKING OF"+FNA("REMEMBER")+"BRI
NG ANYTHING ELSE TO MIND?"):RETURN
  830IF FNINF("DO I REMEMBER") THEN PROC
P("DID YOU THINK I WOULD FORGET"+FNA("RE
MEMBER")+"?"):RETURN
  840PROCP("GO ON !!!"):RETURN
  850REM DREAMS
  860PROCP("CAN YOU DESCRIBE ONE?"):RETU
RN
  870REM DEARMT
  880PROCP("HAVE YOU DREAMT"+FNA("DREAMT
")+"BEFORE?"):RETURN
  890REM IF
  900IF FNINF("WAS") OR FNINF("WERE") TH
EN PROCP("HOW WOULD THAT HELP ?"):RETURN
  910IF FNINF("ONLY") THEN WISH$=FNA("ON
LY"):PROCP("WHAT WOULD YOU DO IF"+WISH$)
:RETURN
  920WISH$=FNA("IF")
  930PROCP("DO YOU THINK IT'S LIKELY THA
T"+WISH$):RETURN
  940REM WERE
  950IF FNINYN THEN:RETURN
  960IF FNINF("YOU WERE") THEN PROCP("WH
Y DO YOU TELL ME YOU WERE"+FNA("YOU WERE
")+"NOW?"):RETURN
  970PROCANKEY(" WERE"):RETURN
  980REM WAS
  990IF FNINF("WAS I") THEN PROCP("WHAT
SUGGESTS THAT I WAS"+FNA("I WAS")):RETUR
N
 1000IF FNINYN THEN:RETURN
 1010IF FNINF("I WAS") THEN PROCP("WHAT
SUGGESTS THAT I WAS"+FNA("WAS")):RETURN
 1020PROCANKEY(" WAS"):RETURN
 1030REM NOONE
 1040IF LEN(F$)>8 THEN PROCP("SURELY YOU
 CAN THINK OF SOMEBODY WHO"+FNA("NOONE")
):RETURN ELSE A%=0:T%=TRUE:RETURN
 1050REM EVERYBODY
 1060PROCP("CAN YOU THINK OF ANYONE IN P
ARTICULAR ?"):RETURN
 1070RETURN
 1080PROCP("CAN YOU THINK OF A SPECIFIC
 INCIDENT?"):RETURN
 1090REM MAYBE
 1100PROCP("YOU DON'T SEEM QUITE CERTAIN
"):RETURN
 1110REM SORRY
 1120PROCP("PLAESE DON'T APOLOGISE."):RE
TURN
 1130REM HELLO
 1140PROCP("HOW DO YOU DO. PLAESE TELL M
E YOUR PROBLEM."):RETURN
 1150REM NEVER
 1160IF RND(2)=2 THEN PROCP("YOU SEEM QU
ITE CERTAIN."):RETURN
 1170PROCP("ARE YOU SURE THAT"+F$):RETUR
N
 1180REM WHEN & WHAT
 1190PROCP("WHY DO YOU ASK?"):RETURN
 1200REM WHY
 1210IF FNINF("DON'T I") THEN PROCP("PER
HAPS I WILL"+FNA("DON'T I")+"IN GOOD TIM
E."):RETURN
 1220IF FNINF("CAN'T YOU") THEN VICE$=FN
A("CAN'T YOU"):PROCP("HAVE YOU ANY IDEA
WHY YOU CAN'T"+VICE$):RETURN
 1230IF FNINF("WHY YOU") THEN PROCP("WHY
```

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typed and stores it in the memory. It also replaces the keywords with a substitute, *eg* for MOTHER, FAMILY.

PROCCHANGE This procedure changes key words such as I and ME to YOU and I respectively. This has the effect of changing the sentence entered to Eliza's point of view.

FNIN This is same as INSTR in Basic. This function is used because the BBC OS 1.2 operating system has a bug which can crash the computer. See page 281 of the user manual.

FNIN2 This is another version of INSTR.

FNINF This is an INSTR for string F$. F$ is the processed input after it has gone through PROCCHANGE.

PROCP This prints Eliza's remarks. It also changes D% to TRUE. D% = TRUE indicates that a reply was found and dealt with. When D% is set the program asks for further input.

PROCKEY This is the procedure which finds the key words. It goes through every word you have typed in and compares it with its database.

FNSWOP This function swops a word in a string with another word.

PROCANKEY When another keyword is required this procedure masks the unwanted original keyword then finds a new keyword.

PROCFLANNEL This procedure is called

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```
?"):RETURN
 1240IF FNINF("WHY DO I") THEN PROCP("DO
 I REALY"+FNA("DO I")+"?"):RETURN
 1250IF FNINF("WHY DO YOU") THEN PROCP("
 I AM NOT SURE WHY YOU"+FNA("YOU")):PRINT
 "WE MUST ANALYSE THIS PROBLEM STEP BY ST
 EP. NOW, CAN YOU THINK OF ANY REASON WHY
  YOU";FNA("YOU"):RETURN
 1260PROCP("WHAT PROMPTED YOU TO ASK THA
 T QUESTION?"):RETURN
 1270REM BECAUSE
 1280IF FNINF("BECAUSE YOU ARE") THEN PR
 OCP("WHO ELSE SAYS YOU ARE"+FNA("BECAUSE
  YOU ARE")):RETURN
 1290IF FNINF("BECAUSE YOU") THEN GOSUB1
 310:RETURN
 1300PROCP("IS THAT THE ONLY REASON?"):R
 ETURN
 1310IF FNINF("I AM")=FALSE THEN IF FNIN
 F(" I ") THEN F$=FNSWOP(F$," ME "," I ")
 1320IF FNINF("DON'T") THEN F$=FNSWOP(F$
 ," AM NOT "," AM "):F$=FNSWOP(F$," "," D
 ON'T ")
 1330PROCP("CAN YOU THINK OF ANY OTHER R
 EASON APART FROM THE FACT THAT"+FNA("BEC
 AUSE")):RETURN
 1340REM I
 1350IF FNINF("I FOOL") OR FNINF("I IDIO
 T") OR FNINF("I JERK") OR FNINF("I TWIT"
 ) THEN PROCP("PERHAPS YOU ARE THE"+FNA("
 I")):RETURN
 1360IF FNINYN THEN RETURN
 1370IF FNINF("I AM") THEN PROCP("WHAT M
 AKES YOU THINK I AM"+FNA("I AM")):RETURN
 1380IF FNINF(" YOU") THEN GOSUB1400:RET
 URN
 1390F$=FNSWOP(F$," ELIZA "," I "):PROCA
 NKEY(" ELIZA"):RETURN
 1400IF FNINF(" YOU")<FNINF(" I") THEN
  F$=FNSWOP(F$," ME "," I "):PROCP("WHY D
 O YOU SAY THAT"+F$):RETURN ELSE GOSUB143
 0:RETURN
 1410REM MY
 1420PROCP("WHAT ABOUT YOUR OWN"+LEFT$(F
 NA("MY"),FNIN2(FNA("MY")," ",2))):RETURN
 1430REM YOU
 1440IF FNINF("YOU CAN'T") THEN VICE$=FN
 A("CAN'T"):PROCP("DO YOU KNOW WHY YOU CA
 N'T"+VICE$):RETURN
 1450IF FNINF("YOU DON'T") THEN PROCP("W
 HY?"):RETURN
 1460IF FNINF("WANT") THEN T$=FNA("WANT"
 ):GOSUB1730:RETURN
 1470IF FNINF("NEED") THEN T$=FNA("NEED"
 ):GOSUB1730:RETURN
 1480IF FNINF("GIVE YOU") THEN T$=FNA("G
 IVE YOU"):GOSUB1730:RETURN
 1490IF FNINF("TELL YOU") THEN T$=FNA("T
 ELL YOU"):GOSUB1730:RETURN
 1500IF FNINF("CAN YOU HAVE") THEN T$=FN
 A("CAN YOU HAVE"):GOSUB1730:RETURN
 1510IF FNINF("DEMAND") THEN T$=FNA("DEM
 AND"):GOSUB1730:RETURN
 1520IF FNINF(" GET ") THEN GOSUB1620:RE
 TURN
 1530IF FNINF("WILL") THEN WISH$=" YOU "
 +FNA("YOU "):PROCP("DO YOU THINK IT'S LI
 KELY THAT"+WISH$):RETURN
 1540IF FNINF("WISH") THEN PROCP("NO USE
  WISHING FOR SOMETHING. YOU GOT TO BE MO
 RE PRACTICAL.."):RETURN
 1550IF FNINF(" I ") THEN GOSUB1640:RETU
 RN
 1560IF FNINF("THINK ABOUT") OR FNINF("T
 HINK OF") THEN PROCP("TELL ME. DOES THE
 THOUGHTS"+FNA("THINK")+"PROVOKE ANY REAC
 TION?"):RETURN
 1570IF FNINF("THINK") OR FNINF("BELIEVE
 ") THEN GOSUB1660:RETURN
 1580IF FNINF("YOU ARE") THEN GOSUB1680:
 RETURN
 1590IF D%=FALSE THEN B%=A%:PROCANKEY("
 YOU "):T%=TRUE:IF A%=0 THEN A%=B%:T%=FAL
 SE
 1600IF LEFT$(F$,4)="  YO" THEN PROCP(F$
 +"?")  1610RETURN
 1620IF FNINF("SAD") THEN PROCP("OH DEAR
 . WE WILL WORK TOGETHER AND ANALYSE WHY
 YOU GET "+SAD$+FNA("SAD")+".":RETURN
 1630REWARD$=FNA(" GET "):PROCP("DO YOU
 LIKE GETTING "+REWARD$+"?"):RETURN
 1640IF FNINF(" I ")<FNINF(" YOU ") THEN
  PROCP("WHAT MAKES YOU THINK THAT I"+FNA
 (" I ")):RETURN ELSE GOSUB1350:RETURN
 1650RETURN
 1660IF FNINF(" I ") THEN PROCP("WHAT MA
 KES YOU THINK THAT I "+FNA(" I ")):RETUR
 N
 1670PROCP("WHAT MAKES YOU THINK THAT "+
 FNA(" THINK "):RETURN
 1680IF FNINF(" SAD ") THEN PROCP("I AM
 SORRY TO HEAR YOU ARE "+SAD$):RETURN
 1690IF FNINF(" HAPPY ") THEN PROCP("HOW
  HAVE I HELPED YOU TO BE "+HAPPY$):RETUR
 N
 1700IF FNINF(" I ") THEN F$=FNSWOP(F$,"
  ME "," I "):PROCP("WHY DO YOU SAY THAT"
 +F$):RETURN
 1710IF FNINYN THEN RETURN
 1720IF LEN(FNA("YOU ARE"))>4 THEN PROCP
 ("HOW LONG HAVE YOU BEEN"+FNA("YOU ARE")
 ):RETURN ELSE A%=0:T%=TRUE:RETURN
 1730RESTORE 1840
 1740C%=0
 1750REPEAT
 1760C%=C%+1:READ A$
 1770UNTIL FNINF(A$) OR A$="1234"
 1780IF A$="1234" THEN PROCP("WHAT WOULD
 IT MEAN TO YOU IF YOU GOT"+T$):RETURN
 1790IF C%>0 AND C%<10 THEN PROCP(A$+" W
 ILL SOLVE NOTHING. YOUR PROBLEMS RUN MUC
 H DEEPER. WHAT MAKES YOU THINK I CAN GIV
 E THAT TO YOU?"):RETURN
```

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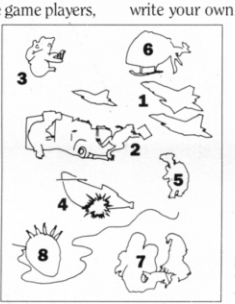

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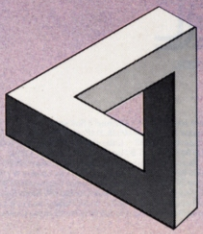

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when no keyword is found.

PROCSWEARING This deals with abuses the user cares to type in.

The rest of the program is subroutines for individual keywords. There are REM statements before every subroutine.

Here are most of the important variables used. If it is not listed here that means that they are temporary variables not worthy of a mention.

S$ This stores what you enter.

FS This is the S$ after PROCCHANGE. It is the most important variable and is constantly used by the program.

T% When T% = TRUE it means that the first keyword was rejected and the program goes through the main loop again.

D% D% = TRUE indicates that Eliza has given a reply.

MEMORY$, WISH$, VICE$, DESIRE$, SAD$, HAPPY$, REWARD$ — these are all Eliza's memory about the user.

The program has various drawbacks because of its limited length. Besides, the original program had an inherent problem of not being able to cope with complex sentences. Weizenbaum states that the more programming you put in, the cleverer it gets, and so not being able to put vast amounts of data in means this version can get rather confused.

Anyone interested in artificial intelligence should read Joseph Weizenbaum's *Computer Power and Human Reason*, published by W H Freeman and Co. There is also an excellent book called *The Super-Intelligent Machine* by Adrian Berry, science correspondent of the *Daily Telegraph*. (Publisher Jonathan Cape).

```
 1800IF C%=10 THEN PROCP("AREN'T I HELPI
NG YOU?"):RETURN
 1810IF C%=11 THEN PROCP("THERE IS NO OV
ERNIGHT CURE."):RETURN
 1820IF C%=12 OR C%=13 THEN PROCP("I WIS
H I COULD GIVE YOU A STRAIGHT FOREWARD "
+A$+" BUT THAT WON'T HELP YOU. YOUR PROB
LEMS RUN MUCH DEEPER.")
 1830RETURN
 1840DATA SEX,AFFAIR,ROMANCE,FOOD,CIGARE
TTE,DRINK
 1850DATA ALCOHOL,PILL,TRANQUALISER,HELP
,CURE
 1860DATA ANSWER,EXPLANATION,1234
 1870REM YOUR
 1880IF FNINF("FAMILY") THEN PROCP("WHO
ELSE IN YOUR FAMILY"+FNA("FAMILY")+"?"):
RETURN
 1890IF FNINF(" YOU ") AND FNINF(" FEEL
") THEN MEMORY$=FNA("YOUR"):PROCP("WHY D
O YOU SAY YOUR"+MEMORY$+"?"):RETURN
 1900IF FNINF(" YOU ") THEN IF FNINF(" Y
OU ")<FNINF(" YOUR ") THEN PROCP("TELL M
E MORE ABOUT YOUR"+FNA(" YOUR")):RETURN
 1920PROCP("YOUR"+FNA("YOUR")+"?"):RETUR
N
 1930REM HE
 1940PROCP("CAN YOU TELL ME WHY HE "+FNA
(" HE")):RETURN
 1950REM SHE
 1960PROCP("CAN YOU TELL ME WHY SHE "+FN
A(" SHE")):RETURN
 1970REM THEY
 1980IF FNINF("THEY AM ") THEN F$=FNSWOP
(F$," ARE "," AM ")
 1990PROCP("CAN YOU TELL ME WHY THEY "+F
NA(" THEY")):RETURN
 2000REM YES
 2010YES=FNYESNO(YES):RETURN
 2020REM NO
 2030NO=FNYESNO(NO):RETURN
 2040DEF FNYESNO(YN)
 2050IF YN=0 THEN PROCP("YOU SEEM QUITE
CERTAIN?"):=1
 2060IF YN=1 THEN PROCP("ARE YOU SURE?")
:=2
 2070IF YN=2 THEN PROCP("OK. LET'S CHANG
E THE SUBJECT. TELL ME MORE ABOUT YOURSE
LF."):=0
 2080DEF FNINYN
 2090IF FNINF(" YES ") THEN GOSUB2010:=T
RUE
 2100IF FNINF(" NO ") THEN GOSUB2030:=TR
UE
 2110=FALSE
 2120DEFPROCFLANNEL
 2130IF FAMILY$<>"" THEN PRINT"TELL ME M
ORE ABOUT YOUR ";FAMILY$:FAMILY$="":ENDP
ROC
 2140IF DESIRE$<>"" THEN PRINT"PERHAPS W
E SHOULD CONSIDER WHAT WOULD ENABLE YOU
TO ";DESIRE$:DESIRE$="":ENDPROC
 2150IF WISH$<>"" THEN PRINT"WHY DON'T Y
OU TELL ME WHAT YOU WOULD DO IF";WISH$:W
ISH$="":ENDPROC
 2160IF SAD$<>"" AND VICE$<>"" THEN PRIN
T"PERHAPS YOU WOULD FEEL "+SAD$+" LESS I
F YOU WERE ABLE TO ";VICE$:SAD$="":VICE$
="":ENDPROC
 2170IF SAD$<>"" THEN PRINT"TELL ME MORE
 ABOUT WHEN YOU FEEL ";SAD$:SAD$="":ENDP
ROC
 2180IF MEMORY$<>"" THEN PRINT"DOES THAT
 HAVE ANYTHING DO TO WITH THE FACT THAT
YOUR";MEMORY$:MEMORY$="":ENDPROC
 2190IF HAPPY$<>"" THEN PRINT"DOES THIS
AFFECT WHETHER YOU FEEL ";HAPPY$:HAPPY$=
"":ENDPROC
 2200IF VICE$<>"" THEN PRINT"WHAT DO YOU
 THINK WOULD HELP TO ";VICE$:VICE$="":EN
DPROC
 2210IF REWARD$<>"" THEN PRINT"WOULD YOU
 LIKE TO GET ANYTHING ELSE APART FROM ";
REWARD$:REWARD$="":ENDPROC
 2220LIMIT=LIMIT+1
 2230 IF LIMIT=1 THEN PRINT"WHAT EXACTLY
 DO YOU MEAN?":ENDPROC
 2240IF LIMIT=2 THEN PRINT"TELL ME MORE"
:ENDPROC
 2250IF LIMIT=3 THEN PRINT"HOW DOES THIS
 RELATE TO YOU TROUBLES?":ENDPROC
 2260IF LIMIT=4 THEN PRINT"PERHAPS YOU S
HOULD TAKE LIFE LESS SERIOUSLY":ENDPROC

 2270PRINT"SORRY YOUR TIME IS UP.":END
 2280DEFPROCSWEARING:H%=FALSE:RESTORE 23
30
 2290FOR I%=1TO6:READ A$:IF FNINF(A$) TH
EN H%=TRUE:A%=0
 2300NEXT
 2310IF H% THEN GOSUB2340
 2320ENDPROC
 23330 DATA CLEAR,CRETIN,NAFF,WALLY,BUZZ,
 BLAST
 2340PROCP("I CAN SEE THAT YOU ARE UPSET
")
 2350IF RND(2)=1 THEN PRINT"MAYBE YOU OU
GHT TO RELAX A LITTLE BIT." ELSE PRINT"W
HY DON'T YOU JUST SAY GOOD BYE"
 2360RETURN
 2370DEFPROCINIT
 2380MEMORY$="":WISH$="":VICE$="":DESIRE
$="":SAD$="":HAPPY$=""
 2390REWARD$="":FAMILY$="":LIMIT=0:YES=0
:NO=0:ENDPROC
```

Improve your on-screen characters with Kevin Ball's double height routine.

Think BIG

Spectrum owners who've been hiding their faces when anyone mentions the double height characters on the Oric and the BBC can now proudly announce that the Spectrum can also display double height characters.

Having studied the method the Oric uses to implement elongated characters, I arrived at the conclusion that there were two possible methods. First, you could use a routine to expand an ASCII code, find the character image bytes in the ROM, and load the ROM bytes into the display file at a particular place, or a routine which looks at a character area of the display file and expands the bytes it finds there to produce a double height character.

Methods

The methods are similar, and both are roughly the same length. Although the first method may be slightly easier, I have used the second method because it gives an advantage over most other double height character routines. The way you use the routine is to print a character on the screen, POKE the PRINT AT coordinates into two locations and RANDOMIZE USR the start address of the routine. The double height character appears in the original character position, but of course it covers the character position in the next line down as well.

Thus whatever you had in the character square is elongated: normal characters, high resolution lines or user defined graphics. With the first method only ROM based characters can be printed.

I have written the routine with no absolute jumps or CALL statements in it, with the advantage that the code is totally re-locatable — that is it doesn't matter where in RAM you put the routine, whether it is a 16K or a 48K machine, it will still work. As a result the code is slightly longer than it would be if I had used subroutines, but I think that having the code re-locatable is an advantage worth sacrificing a few bytes for. The routine as it stands only takes 80 bytes and CALLs the ROM routines to calculate the display file addresses.

Just before the routine is called, the coordinates of the character position have to be POKEd into the buffers (which are located in the system variables). This tells the routine where to look in the display file for the character bytes to expand. The part of the routine that works out the display file addresses could be done away with, as when a character is printed on the screen the address is automatically loaded into the system variable DF CC. However this would mean that the routine could only be used with the last character printed, and never with high resolution lines and other such parts of the display. Using the buffers to hold the PRINT AT coordinates for the routine means that you can expand a character square whenever you like, regardless of when it was printed, which is much more flexible.

The routine includes range checking of the coordinates, and will not use values that are not valid screen positions. For instance, if you input a row value of 21, the character will not be expanded because then it would overflow into the bottom section of the screen.

Demonstration

When the routine is CALLed, as well as expanding the bytes of the character square it also preserves the attributes of the printed character and moves them down a character block to follow the bottom half of the elongated character. I thought that this method would be easier to use than having to work out a new attribute byte and then poke it into another buffer somewhere.

The code bytes can be loaded any way you like, but I have provided a short loading and demonstration program which will work on any Spectrum. If you have a 48K Spectrum, out of respect for your vast amount of storage space, please move it higher up the memory.

Below, a Basic loader and demonstration. Right, the disassembled machine code.

```
          LD BC,
          LD A,C
          CP 32
          JR C, cont a
          RET
cont a:LD A,B
          CP 21
          JR C, cont b
          RET
cont b:CALL CL-ADDR
          PUSH BC
          LD B,0
          ADD HL,BC
          POP BC
          PUSH HL
          PUSH HL
          LD A,B
          INC A
          CALL CL-ADDR
          LD B,0
          ADD HL,BC
          EX DE,HL
          ADD HL,BC
          PUSH HL
          LD B,4
loop a:LD A,(HL)
          LD (DE),A
          DEC D
          LD (DE),A
          DEC D
          DEC H
          DJNZ loop a
          POP DE
          LD B,4
loop b:LD A,(HL)
          LD (DE),A
          DEC D
          LD(DE),A
          DEC D
          DEC H
          DJNZ loop b
          POP HL
          LD A,H
          RRCA
          RRCA
          RRCA
          AND 3
          OR 88
          LD H,A
          LD A,(HL)
          LD BC,32
          ADD HL,BC
          RET
```

```
10 CLEAR 32499
20 LET a=32500
30 READ z: IF z<>999 THEN POKE a,z:
LET a=a+1: GO TO 30
40 DATA 237,75,176,92,121,254,32,56
50 DATA 1,201,120,254,21,56,1,201
60 DATA 205,158,14,197,6,0,9,193
70 DATA 229,229,120,60,205,158,14,6
80 DATA 0,9,209,1,0,7,9,235
90 DATA 9,229,6,4,126,18,21,18
100 DATA 21,37,16,248,209,6,4,126
110 DATA 18,21,18,21,37,16,248,225
120 DATA 124,15,15,15,230,3,246,88
130 DATA 103,126,1,32,0,9,119,201
140 DATA 999
150 INPUT "Character?  ";a$
160 INPUT "Row?  ";r
170 INPUT "Column?  ";c
180 POKE 23729,r: POKE 23728,c
190 PRINT AT r,c; FLASH 1;a$
200 RANDOMISE USR 32500
210 GO TO 150
```

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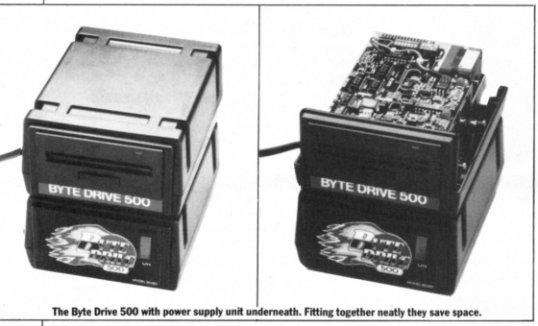
.....

The advent of the 3 inch disk drive for the Oric, BBC and other micros is heralded by Piers Letcher.

500 Kbyte drive



The Byte Drive 500 with power supply unit underneath. Fitting together neatly they save space.

The Byte Drive 500 promises to put a range low-cost micros 'on-line' to fast-access disk storage and reasonably sophisticated file-handling.

As a drive for the Oric, this is an important peripherals development, beating Oric to the mark and providing a useful addition to the Oric range.

What makes this drive different from others is the way it connects to your computer. The 'hybrid cable', developed by ITL and Tyrell Systems, has an interface built into it so, in the same way as a printer, the drive can be used with different cables for different machines.

There is a 'hybrid cable' available to make the drive compatible with the Oric, and it can also be used with the BBC since this has its own disk operating system (DOS). ITL plans to produce cables for the Commodore 64, the Dragon and the Spectrum early next year.

Presentation

The drive is compact, neat, and will come with a 96-page manual, though at the time of this review it was still at the printers. The power supply unit (PSU) has the same casing as the drive, and they fit together snugly and look smart (except for a toy-like coloured transfer on the PSU).

Installation

In the absence of a connecting cable, documentation, or any software, we plugged the drive straight into a BBC. Even without a manual, it is simple to put together.

With this configuration, we formatted the 3in disk using the FORM40 program from the 5.25in disk, and then saved programs onto it. The writing takes longer than the reading, but both are fast. A 20K file takes about 2.5 seconds to read from, and about three seconds to write.

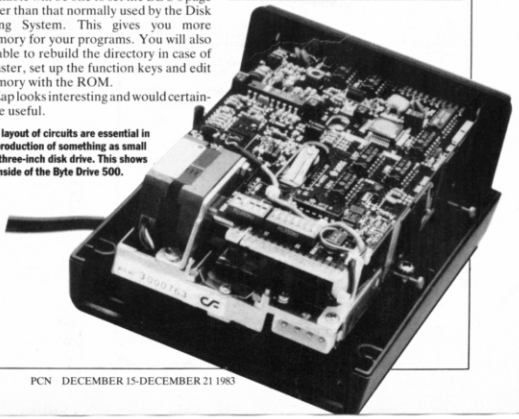
At the moment, the BBC system works in single density, giving only 100K on the disk. By turning the disk over you get another 100K. Once the development of a double density system has been completed, giving 80-track disks, this 200K storage capacity should be nearly doubled.

For the Oric, the drive will store 220K per side, giving the advertised 440K. BBC owners will be supplied with a format and verify disk with the drive. And if you're only using one drive with the BBC then you can save money by using the power socket from your BBC, rather than using the PSU.

There is also a ROM called 'zap' being developed in Bristol to provide extra disk software for the BBC. Among the utilities available will be one to set the BBC's page lower than that normally used by the Disk Filing System. This gives you more memory for your programs. You will also be able to rebuild the directory in case of disaster, set up the function keys and edit memory with the ROM.

Zap looks interesting and would certainly be useful.

Neat layout of circuits are essential in the production of something as small as a three-inch disk drive. This shows the inside of the Byte Drive 500.



Reliability

It's interesting to look at results from Bristol University, where 40 of the drives are being used successfully with BBCs. According to a spokesman, of 200 double-sided 3in disks, only three sides out of the 400 have developed faults after heavy usage, which compares very favourably with the reliability of 5.25in disks.

The manufacturer's confidence in the product is reflected by the long guarantee on the equipment — one year for both the PSU and the drive, though after 90 days ITL reserves the right to replace a faulty drive with a reconditioned one.

Verdict

Though intended mainly for use with the Oric in the first instance, the drive performs adequately with the BBC, and the new ROM should be interesting.

There may be doubts about producing a drive for the Spectrum, since it will be twice the price of the computer, and for most people the Microdrive gives a sufficiently fast storage medium, at less cost. Even so, it would certainly give the Spectrum new scope.

More interesting is the planned Dragon version, which should store far more than the Dragon drive, while being a lot less bulky. But no-one knows exactly when this will appear.

Finally, the main problem for independent manufacturers of add-ons is software compatibility, because it's not much use having a disk drive if you can't use commercial programs on it. How much software will emerge remains to be seen.

The Byte Drive 500 will be available from retailers for the Oric from January 1984.

Name Byte Drive 500 **Manufacturer** ITL Kathmill, 0634 815464 **Price** Floppy Disk Drive £192.37 inc VAT; Power supply unit £29.82 inc VAT; Hybrid Cable + Disk + Manual £99.42 inc VAT **Outlets** Retail.

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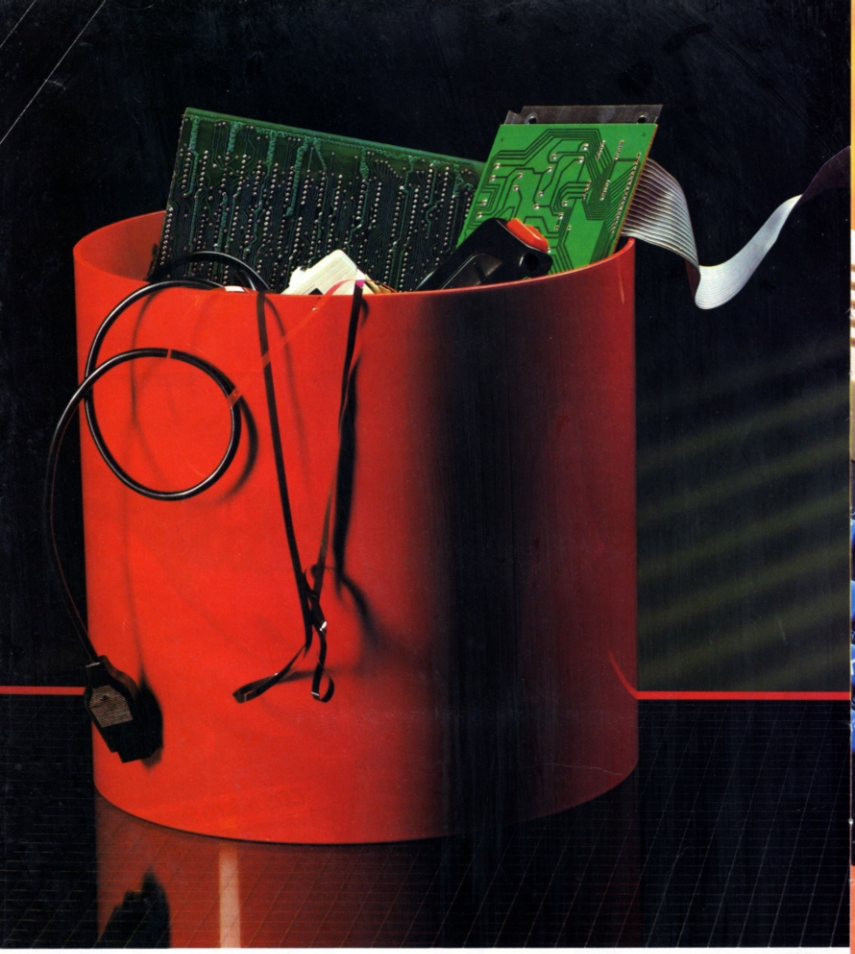

After you've owned a micro for a while you begin to wish you'd invested in a bigger memory.

But when you want to upgrade you are suddenly faced with a number of problems the brochures didn't mention.

If you have one of the cheaper models you probably won't be able to upgrade at all.

And with some of the more sophisticated machines you will be shocked by the expense of the hardware required to upgrade.

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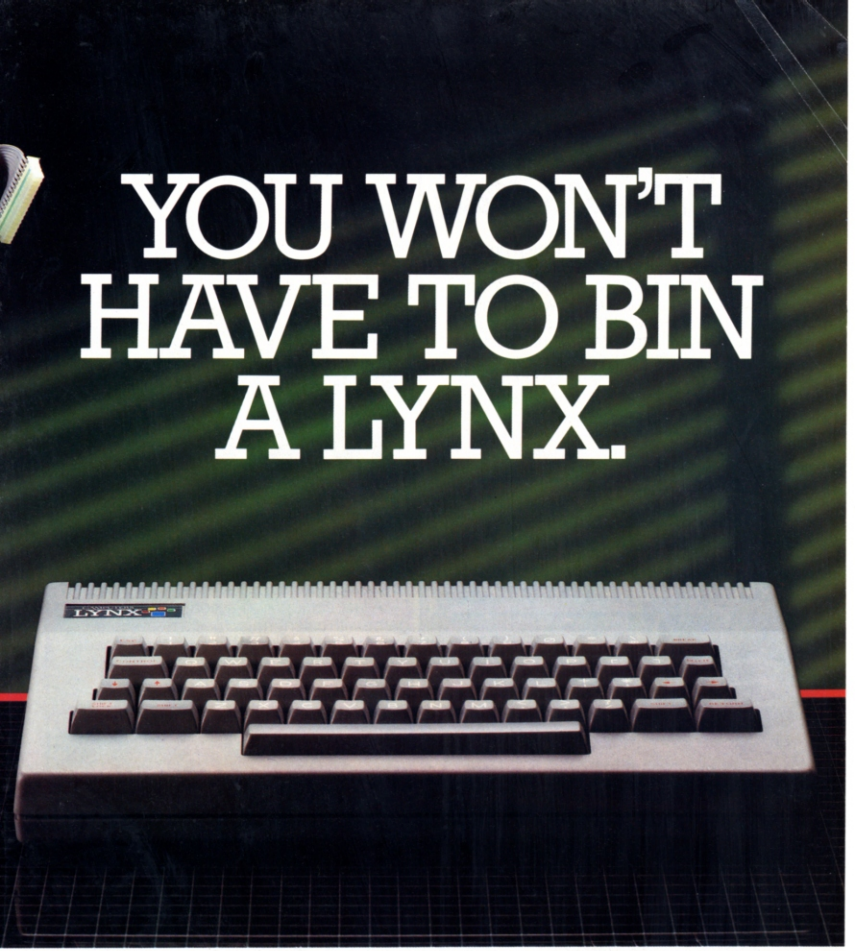

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The 128K Lynx (available December) with additional Disk Drives opens the door to the exciting world of CP/M* where you will find a vast range of ready made small business programs from famous software houses.

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*CP/M is the trademark of Digital Research Inc.

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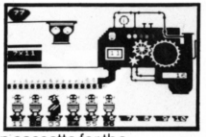

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A couple of scraps from Barry Miles bring good news for programmers and Commodore owners.

Down to earth

Why should anyone want a power cleaner? has to be the first question for consideration. If you have ever lost a file by virtue of the computer suddenly doing a hard reset, i.e. turning itself off and on again without your intervention, you will know why!

This product is not cheap. There is a 3 Amp version at £69, and a 6 Amp version at £119. A power conditioner stands sentinel between you and disaster, by helping to prevent spikes or glitches (sudden changes or drop-outs) in the power supply. Not only can 'dirty' power kill your memory, it can also corrupt a disk if an access is in progress.

First impressions

Operation is simplicity itself. All you do is plug the 13 Amp plug into the power supply socket, and plug the computer into the 13 Amp socket on the Power Cleaner. The point for the microcomputer user is that ring mains are subject to interference from power spikes, even from an electric kettle being switched on or a vacuum cleaner being started up. I have been a frequent sufferer. Switching a printer on and off can have the same effect.

The device is claimed to clip off voltage spikes at a predetermined safe level, and dump them safely to earth. It is also claimed to be better than many such filters on the market, which often use standard filter circuits. These can do more harm than good. Under mismatch conditions they are prone to resonate at certain frequencies, destabilising the supply further.

In use

I made empirical tests by switching many loads connected to the same ring mains on and off with no result, whereas switching a printer off easily reset the computer if the Power Cleaner was not in place.

The small manual gives much useful information. This includes the ominous warning that you really need one Power Cleaner for each device, otherwise your disk drive may reset itself, whilst writing, whereas your computer may be happily protected.

Verdict

Most of us are apt to put a too low value on time, but £69 does not represent much time wasted to a business person, nor to a busy programmer, who loses an afternoon's development work. If you make serious use of your machine, can you afford to lose your data?

Item INMAC Power Cleaner (6634) **Manufacturer** INMAC Ltd., (09285) 67551 **Price** £69 + VAT (3 Amp version) £119 + VAT (6 Amp version) **Contact** INMAC

64 Monitor magic

One year after the first Commodore 64 arrived in the United Kingdom, supplies of the video monitor are now available.

At first sight, it seems that a £229 monitor for a £199 Commodore is a bit of a luxury, like running a Fiat Uno on Gin. However, eyestrain is a very real problem with colour computers connected to domestic television sets, and the best of the anti-glare devices can cost up to half the price of the monitor.

Features

The picture is larger than that on a 14inch television, and there is no comparison in the picture quality. If you are using a monitor, there is no problem with the video going out of tune, whereas, if you are using a television, the signal can drift alarmingly, as both television and computer get warm with time. Even if your television has an automatic frequency control which locks it onto the signal, you will still have problems if you should need to switch the computer off and on again, in order to be really sure you have an empty machine.

The problem of colour bleeding from one pixel to another, which occurs no matter how good your television may be, is entirely eliminated by a monitor. By the way, if the colour is bad on your Commodore 64, try finding out how much a new VIC video chip will cost you. This chip has been through many revisions, and the improvements are startling.

Getting started

This is where the fun comes in. Unless you have a fairly recent model of the Vic or 64, you will find that the cable supplied with the monitor will not fit the computer. It has eight pins, which is too many! However, you can buy an appropriate five pin lead from any good audio shop, and connect the lead to the front of the monitor.

It is also possible to rewire the lead supplied so that you can take the signal into the luminance and chrominance sockets at the rear of the monitor. In this way you will obtain full picture quality.

The manual supplied is short but adequate, and gives you all the necessary information.

In use

The machine has a considerable degree of adjustment available, from volume, through tint, colour, brightness, contrast and of course horizontal and vertical hold.

The picture quality is excellent, and if you put rows of identical characters across the top and bottom three lines, you will find they do not vary at all.

The combination of tint and colour adjustments gives really fine control over colour.

Verdict

I can best describe my opinion of the machine by saying I have relegated my Sony Trinitron 14" portable to other uses, and bought a Commodore 1701 monitor.

Item Commodore 1701 Colour Video Monitor **Manufacturer** Commodore Computers (0753) 74111 **Price** £229 **Contact** Commodore dealers.

AT LAST, A HOME COMPUTER THAT IMPROVES WITH AGE.

It's surprising how many first-time relationships with a home computer go sour with age.

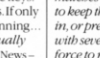
You buy an attractive, discounted little machine so that you and the children can learn about computers.

Instead, you learn about its limitations: the dull graphics. The plugs that fall out. The cheap power supply. The unalterable "beginners" language. The stiff, fragile keys. No provision for future developments. If only you'd looked around a bit in the beginning...

"Quality costs a little more, but it's usually worth paying for" (Personal Computer News – CGL M5 Review, June '83.)

The CGL M5 is designed and built by Sord, one of Japan's leading computer specialists, with three main ideas in mind.

First, to be easy and fun to learn and operate.



Second, to be rugged enough to last through hours and hours of operation.

And third, to form the basis of a powerful, versatile home computer system that won't need replacing until you're ready for a dedicated business system.

Built to learn

The CGL M5 is designed to be easy for non-geniuses to use.

"On the M5, most of the work is done for you, and all that is left is the need to work out what to do next, rather than how to do it." (Personal Computer News, June '83.)

If you make a mistake, you can correct it with a simple movement of the cursor. So you only correct that mistake, not a whole line; nor do you have to indulge in complex edit commands.

Budding video game designers and computer artists will love to get their hands on the 16 colour graphics and 32 moveable images called "sprites."

"The M5 makes professional graphic effects very simple for even the beginner to achieve." (Personal Computer World, Aug. '83.)

Built to last

"It works first time, doesn't need a lot of mollycoddling and jiggery-pokery to persuade it to continue to do so, and what's even better, it continues to work well. You don't have to balance cold cartons of milk on the top, shove matches in the back to keep the plugs in, or press the keys with several pounds force to make them respond." (Personal Computer News, June '83.)

Being able to build things that work and carry on working without endless maintenance is something at which the Japanese seem to excel.

Built to grow

To be truly versatile, a home computer has to understand very different things.

So you need different "languages," which the M5 provides by supplying part of its memory in plug-in cartridges.

"The M5 eliminates the worst limitations on machines at this level, which is that they tend to be stuck with whatever language is provided by the management." (Personal Computer News, June '83.)

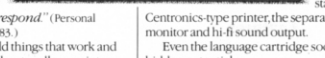
The computer is supplied complete with a Basic-I cartridge, a standard integer BASIC language and a simple learning text.

Plug in the Basic-G cartridge, and you can access the M5's incredibly sophisticated graphic and sound capabilities which are far in advance of similarly-priced computers.

Move on to the Basic-F cartridge, and you have scientific, technological and statistical computing power usually available only on big computers with equally big price tags.

The FALC cartridge provides a tailor-made language for data management, spreadsheet accounts and business problems. Combine FALC with a disc and you could *"turn the M5 into a small business machine"*. (Personal Computer Magazine, August '83.)

Now, take a look at the back of the M5.



Notice the sockets (usually an extra) for a standard Centronics-type printer, the separate video monitor and hi-fi sound output.

Even the language cartridge socket has hidden potential:

"Unlike most such sockets, this one has 56 internal lines connected to it giving access to just about every function in the computer. This means that just about everything you can think of can be added onto the computer, ranging from a Prestel interface to second processor to use as an intelligent terminal on a timesharing computer"... (Electronics – The Maplin Magazine, March '83.)

Take a look at the home computer that will improve with age.

For a full technical specification of the CGL M5, details of the wide range of supporting software and to find out where to see a complete demonstration, send the coupon to: CGL, CGL House, Goldings Hill, Loughton, Essex IG10 2RR. Telephone number: 01-508 5600.

I'd like to know more about the CGL M5. Please send me a brochure and a list of dealers. PCN 5

Name_____

Address_____

CGL M5 HOME COMPUTER

BUILT TO LEARN, BUILT TO LAST, BUILT TO GROW.

PCN micropaedia

Vol 13 Part 3

SOFTWARE

Christmas Software Buyer's Guide

PULL OUT AND KEEP

SOFTWARE SELECTION

Whether you've just bought a personal computer, had one for some time or are expecting one on Christmas Day, one thing you'll be looking for is some good software to ease the digestion of the Christmas fare or to stave off boredom during the re-runs of old films on the TV.

In this Micropaedia we'll give details of how to select the best value programs for your money, as well as a list of the best games we've reviewed in our pages this year.

The first thing to do is look carefully at your needs. Software can be divided roughly into a number of areas such as: applications, utilities educational and games. This list is not comprehensive and there are bound to be some overlaps.

Applications This covers word processing, database, accounting programs and so on. These are designed to take the slog out of paper work.

If you're looking to make typing easier then you must bear in mind that there's no point buying a word processor unless you have a printer. You should also ask:

- Does the program give an adequate screen size, ie between 40 and 80 characters?
- Does it respond quickly when a word runs off the end of a line? How easy is it to use and is the documentation clear?
- Will it verify your text once you've saved it onto cassette?
- Can you print more than one copy of the text easily?

Databases: If you've reached the stage where you've got so many cassettes or records that you can't keep track of them, then you might consider looking at some database packages. If all you need is a simple card index, then you might be better off buying just that. Databases on micros can be misapplied quite easily. The problem with a card index is that you can retrieve the information in one of two ways: by picking a card from its main heading or by searching the entire set from start to finish. A card box is good for people's names and addresses etc, but no good if, for example, you wish to find out which of these people live in a given town.

The main advantage of a computer database is that you can select cards ('records') on a number of criteria. For example, if you run a club you could pick out all the members who are late with subscriptions *and* who live in a certain town.

The main limitation of computer databases is that you can't usually keep more than 300 cards at a time. If you have a cassette-based program you will have to SAVE and VERIFY the database every time you alter it — this can be a real pain.

The questions to ask here are, will it really save you time and effort? What is the maximum number of records you can keep on it at any one time? How many separate pieces of information can each 'card' hold? (*eg* product description, code value, number in stock, reorder limit.) How many characters (letters) are you limited to for each record?

Accounts: It's at this time of year that you are most likely to be feeling the pinch, financially. Investment in a home accounting or bookkeeping package may help with the management of money matters. In this area you will also find programs that help you calculate heat losses which may help you save money by proper insulation.

As with the database programs, the most important question relates to your needs — will the program *really* save you time and effort? Would it be easier, quicker and cheaper to use a calculator, pen and paper?

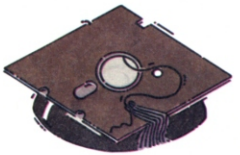
Utilities: These are programs for the more serious hobbyists, who enjoy developing their own programs and finding out more about their machines.

Perhaps the first thing you should consider in this area is another language. Basic is a good language for learning about programming but it shouldn't be the only string to your bow. Forth is now available on most micros which allows you to write arcade games which run very fast indeed. Pascal is becoming increasingly popular on a variety of micros and most versions will give you a good grounding in this structured language. Rarer but just as interesting are, Logo, Lisp and Prolog.

If you want your programs to go faster

but don't want to learn another language you should shop around for a compiler. This is a program that will convert your Basic into machine code. This has the advantage of speeding up the program and making sure other people can't steal those routines that took you hours to code up. Certainly one thing most programmers will find of enormous use is a 'toolbox' of some kind. There are as yet only a few of these about due to their immense value more are being launched every week. Toolkits generally include REM strippers — to take out all the REM lines needed during program development. This can make for great memory savings if space is tight. If you're lucky a toolkit may also have a packing routine which takes out all unnecessary spaces and in some cases joins lines up to save space. An 'unpacker' should also be provided.

If your're interested in working at the heart of the computer, you'll be looking to machine code. In that case you'll need an assembler at least. This saves you the slog of having to convert op-codes to hex, or calculate branches and offsets. A disassembler does the opposite — takes the hex codes from memory and shows you the op-codes. You'll need both of these for getting right down to it and so it is probably worth considering a full monitor system. A good monitor should combine an assembler and disassembler and provide a machine code toolkit with such facilities as, block moves of memory, trace functions, break point settings and so on. The more functions the monitor has the more useful it will be ... and the more expensive.



Education: In the last few months most of the major educational publishers have launched educational programs. These include, Heinemann, Griffin and George, Macmillan Longman and so on. There is also a lot of software being produced by smaller companies like Chalksoft and Widgit Software.

The standard of software in this field is probably more variable than in other areas, some is dreadful, some excellent. Five-Ways is a software company that has produced programs for both Heinemann and Macmillan. Its programs have set the standard by which others should be judged, so try to see them. They are available on Spectrum, BBC and RML380 from retailers, who should be prepared to demonstrate any programs in stock.

Games: There used to be a clear division between adventure and arcade-type games. THis has been blurred over the last few months by programs which use ideas and techniques from the two types.

Arcade-type games can be subdivided into those that mimic the 'real-thing', games like Invaders/Galaxians, Phoenix, Pac-Man, Defender/Scramble, Kong, Asteroids, Berserk and so on.

The main differences between these games lies in how you move relative to the background.

There has been a move of late toward 3D games. These seek to produce the illusion of three dimensions on the screen, so that things don't just move left-right and up-down, but can appear to move into the distance as well. Some of these have tried to use the brain's capacity for giving this impression from the different information obtained from the two eyes. They do this by using two coloured pictures of the same image on the screen and you have to wear coloured glasses to get the effect. These are worth looking at, but they don't always work well on all TVs.

Other games use perspective transformations to get a similar effect. These seem to be pointing the way to a new and exciting direction in games. Of particular note here are Lunar Crabs and Ant Attack.

The main point about arcade-type games is the use of sound and colour graphics on the machine. Don't be misled by the packaging. Sometimes the cassette cover gives the impression that the game uses stupendous graphics, but you'll find that this may be an artist's impression of the title and bear no relation at all to the pictures on the screen. To avoid this, look in the magazines to find reviews accompanied by a 'screen-shot' — a photograph of the game being played. Sometimes you'll find one of these on the inside cover of the cassette.

Adventure games are often 'text-only'. This means that there are no pictures at all. In these you have to type in instructions such as 'go west', 'get rifle', 'open door' and so on. The idea is that you have to complete a quest which might involve finding some secret treasure or simply finding your way out of a labyrinth of rooms and corridors without being killed by some unsavoury thug.

Often you need to have picked up items before you can proceed very far — for example, you may not be able to read a crucial message (or even be told it's there) before picking up and/or using a torch. The best of the strictly text-only adventures should have a very large vocabulary. The program should recognise ten verbs as a rock-bottom minimum and at least twice as many objects. There should also be many locations to move to and from. The best way to find out about these is, again, to read through reviews of the programs or to look at the cover or instruction manual.

The problem with this is that some suppliers deliberately include very little detail about the words you can use, or the objects. One of the main points about an adventure game is that you are supposed to work out all this information for yourself.

There have been a number of games released recently which might be termed 'extended adventure' games. In these you get a picture on the screen of the room you're in and possibly some extra information at the foot or to one side of the screen.

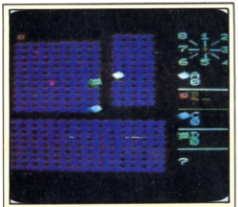
Of particular note here are games like Valhalla. In this, you play the role of a wanderer in the Norse Gods' kingdom. The screen is split into two sections — the top shows your location, yourself and who/whatever might be present. The characters move around rather like those in a cartoon. The lower screen is used for entering commands and getting information about who's who or what's what. The point is that the characters have lives of their own and will move around without your doing anything at all!

Also in this vein are the Oracle's Cave and the Hobbit. There are more and more games breaking into this new territory every week. One to watch out for will be Alice in Wonderland from Audiogenic for the Commodore 64.

Adventure games require more wit than dexterity and it's easy to get addicted to the better ones, rather like getting completely taken up with a film or book. Try to see them in action before buying and bear in mind that the first few times you play them are likely to provide as much frustration as excitement while you're getting familiar with the basic framework.

The better games allow you to do more than just enter two words in the usual verb-object pair. Some will even allow you to enter such complex phrases as telling one of the characters to do something for you!

General rules: Avoid buying programs on the strength of advertising or covers. Some suppliers can generally be relied on to produce high-quality games, but everyone makes the occasional mistake! Check the top-ten charts in different magazines and look through back issues of magazines for reviews. Ask to see games before you buy, but make sure you know what sort of game you're after, or you'll waste a lot of your own time and that of shop assistants.



Harvester

A non-violent game that needs your wits rather than your zapping power.

In a sort of Pacman style you control a harvester which gobbles up dots (Boosterpice) scattered around the screen. The round ends when a player cannot move to gobble more dots.

Up to four players can join in this munching game, using the keyboard to control the harvesters. To a musical accompaniment the harvester trundles off until it hits the edge of the screen, meets another harvester or runs out of dots. The strategy is to gobble a line of dots so your opponent isolated in as small an area as possible, and it's not you who has to abort the round and lose your points.

The graphics are simple but they are effective and include a powerful screen flash routine in the second half if you fail. The sound effects also add neatly to the drama.

If you're looking for intrigue rather than excitement you'll enjoy this game. It certainly doesn't need fast hand-to-eye co-ordination.

Name Harvester
Type Strategic
Price £7.95
Publisher Pixel Productions
Format Cassette
Outlets Mail order, various dealers

Choplifter

This is a one-man game, where in life-like graphics and sound you attempt to rescue hostages imprisoned in enemy territory.

Not an easy task, but with good joystick control you could save lives.

With three helicopters and weapons, you pitch your skills against killer kamikaze satelites which try to ram you, jet aircraft which try to bomb you and tanks which shoot at you when you load and unload your men.

When you've rescued all the men from one blockhouse you seek out another and shoot it open, to release more. Although there's only one level of difficulty, it's high enough to sustain the interest of the most experienced game players.

At times you get high resolution, almost three dimensional, graphics which are very impressive. And you can change the colours by pressing a function key.

This game is quite expensive, but it's good fun for a wide range of age groups, and uses the capabilities of the Vic to the full.

Name Choplifter
Type Pilot
Price £24.95
Publisher Synapse Software
Format Cartridge
Outlets Commodore dealers, mail order

Skyhawk

In effective 3D scenery and excellent scrolling to left and right your task is to defend a town from attacking fighter bombers.

With no time to spare you jump in your jet, take off, then line your targets on the radar. The enemy bombers flash into view. First they start in a formation of two, rising to three at 400 points and four at 1,500.

To add flavour, you have to refuel and rearm periodically, presenting yourself as a sittng duck for what seems eternity. With good sound effects, five jets, bombs and missiles move quickly and smoothly — and the enemies are good pilots too. If shot down they usually manoeuvre their blazing jets into one of your refuelling pads. Highly recommended for would-be fighter pilots.

Name Skyhawk
Type Pilot
Price £7.95
Publisher Quicksilva, 0703 20169
Format Cassette
Outlets Mail order

Mutant Herd

By using the keyboard or a joystick you lure a swarm of mutant entities from a pulsating nuclear powerhouse, in the centre of the screen, whose plutonium they crave.

In a second part of the game, you must destroy the burrows and the queen of the mutant herd.

You can't set the skill level; both parts of the game just get more and more difficult. You control a purple mutant slayer, but if you guide if off the screen instead of into the burrows, you lose a life.

One or two players can play, and it's a game difficult enough to stretch hand-eye co-ordination, yet not so tricky you give up in disgust.

With rudimentary graphics and reasonable sound, Mutant Herd is a welcome change from the conventional arcade game.

Name Mutant Herd
Type Arcade
Price £24.95
Publisher Thorn EMI, 01-836 2444
Format Cartridge
Outlets Shops

Tried and tested for the Vic 20

NAME	TYPE	PRICE	PUBLISHER	FORMAT
Gridrunner	Arcade	£6	Llamasoft	Cassette
Arcadia	Arcade	£5.50	Imagine	Cassette
Computer War	Strategy	£29.99	Thorn	Cassette
Skyhawk	Arcade	£7.95	Quicksilva	Cassette
Metagalactic Llama	Arcade	£6	Llamasoft	Cassette
Cobus Maze	Maze	£5.95	Temptation	Cassette
Bewitched	Puzzle	£5.50	Imagine	Cassette
Kaktus	Arcade	£7.95	Audiogenic	Cassette
Mutant Herd	Arcade	£24.95	Thorn	Cartridge
Mangrove	Simulation	£7.95	Audiogenic	Cassette
Choplifter	Arcade	£7.95	Audiogenic	Cassette

Tried and tested for the Spectrum

NAME	TYPE	PRICE	PUBLISHER	FORMAT	SYSTEM
Psst	Advent	£5.50	Ultimate	Cassette	16/48k
Jumping Jack	Arcade	£5.50	Imagine	Cassette	16/48k
Cookie	Arcade	£5.50	Ultimate	Cassette	16/48k
Magic Mountain	Arcade	£4.95	Phipps	Cassette	48K
Zzoom	Arcade	£5.50	Imagine	Cassette	48k
Splat	Arcade	£5.50	Incentive	Cassette	48k
Football Pools	Utility	£5.95	Hartland	Cassette	48k
Pimania	Advent	£10	Automata	Cassette	48k
Horace Goes Skiing	Arcade	£5.95	Psion	Cassette	16k
Mad Martha	Advent	£5.95	Mikrogen	Cassette	48k

Jet Pac

This is a classic game that tops Space Invaders and Pacman and offers lots of fun.

You're the chief test pilot for Acme Interstellar Transport and your job is to go to various planets to assemble rockets.

Bits of elements, jewels and gold fall from the sky which you snatch, but the aliens get a bit peeved because you've grabbed their worldly goods without so much as paying the V in VAT. And there's only one way to settle the matter — shoot them with your Quad Photon Laser Phasers.

Before you can make a quick getaway, you have to fuel a rocket with six fuel pods which drop from the skies. Each planet has its own share of nasties that try and get you. The first planet has fire-ball type creatures, the second furry creatures. the third vicious bouncing spheres and the fourth some strange looking little insects.

With its good graphics and interesting content you'll have plenty to do to fill those free hours.

Name Jet Pac
Price £5.50
Publisher Ultimate Play the Game, 0530 411485
System 16K
Format Cassette
Outlets W H Smith, John Menzies, Sinclair dealers, mail order

Valhalla

Valhalla is half epic, half cartoon strip and its Norse setting is ideal for those with the fjords in their bloodstream.

With 200 crowns and your brains you have to wend your way through Asgard, Midgard and Hell to pick up a key, a ring, a shield, a sword, an axe and a helmet.

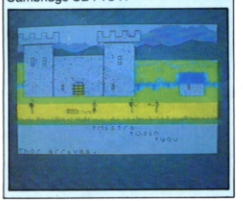
First of all you need to get yourself well equipped. Armour is a must. So are the bare essentials like food and drink. And as you progress through the adventure the condition of your soul is rated.

The graphics are good and varied, and the responses can be slow, but this is because the machine is processing the moves for a number of characters not just you, and the screen features a superb cartoon effect.

The program also allows you to stack instructions. For example, you can type in get food, eat food, go north in quick succession then see your character do all these.

I won't tell you how to solve the quest. What I will tell you is that Valhalla is well worth the rather substantial cost.

Name Valhalla
Price £14.95
Publisher Legend
System 48K
Format Cassette
Outlets Some retail, mail order from Legend, Freepost, 1 Milton Road, Cambridge CB4 1UY.



Manic Miner

For superb graphics and sound, humour and overall addiction there's little can beat Manic Miner for the 48K Spectrum. It scored top marks in Gameplay (Issue 23) and subsequently soared to become a best seller.

Using keyboard or joystick, you manoeuvre Miner Willy through caverns in a long-forgotten mine-shaft near Surbiton in Surrey, collecting keys to unlock a great fortune on resurfacing.

Press ENTER and you're in Central Cavern beginning the great trek upward. The game needs a lot of thought, practice and timing. Robots, ducks and dozens of other creatures, including humming penguins patrol the caves, platforms crumble and conveyor belts whisk Willy off in quite the wrong direction if he's not quick.

Name Manic Miner
Price £5.95
Publisher Bug-Byte, 051-709 7071
Format Cassette
Outlets High street shops

Rescue

An adventure that has all the ingredients — graphics, variety, plenty of surprises, good plot and ease of play to make it a winner.

You have to rescue a princess who is in a castle, and you have four levels of skill from which to choose. You decide how to rescue the princess, you decide what tactics to employ, you decide what objects to use and how to use them.

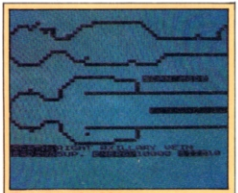
The game is played on a 'board' made up of concentric circles, linked together like a spider's web — and a fresh board is created every time you play.

While you play you can keep tabs on the position of your enemies. The two guards keep on the move at the same time as you, and if they catch up with you, you're well and truly dead.

Name Rescue
Price £5.95
Publisher Computer Rentals, 01-247 9004
Format Cassette
System 48K
Outlets Smiths, Menzies, Boots, Mail order

Tried and tested on the Oric

NAME	TYPE	PRICE	PUBLISHER	FORMAT
The Ultra Light Cycle	Arcade	£6.95	PSS	Cassette
Orik Trek	Advent	£6.95	Salamander	Cassette
Moria	Arcade	£6.95	Severn	Cassette
Oric Flight	Arcade	£5.99	Tansoft	Cassette
3D Maze-Breakout	Arcade	£7.50	IJK	Cassette
Centipede	Arcade	£4.95	PSS	Cassette
Multigames	Strategy	£6.90	Tansoft	Cassette
Nightrider	Advent	£5.50	Cirosoft	Cassette
Invaders	Arcade	£4.95	PSS	Cassette



Fantastic Voyage

If you fancy a trip through the veins of a human body, battling against white blood cells — try Fantastic Voyage.

You are injected into a right arm and must make your way to the brain by navigating through the body's blood-stream. Your aim is to destroy a bloodclot.

On this interesting theme, forget all the medical jargon about veins and arteries you go straight into the scan mode to give a front and side view of the body. You identify your position by a tiny dot which represents a submarine — a strange object to be floating around in a body. Also displayed is your energy level, direction and size, which gets larger the longer you stay in the body.

The movement of the submarine is well done, as you see the artery walls moving past you. But destroying white blood cells is none too easy. They jitter about the screen at a rapid rate and you have to use laser power sparingly.

This is a very good game with clever programming. There's a good deal to do and you won't get bored.

Name Fantastic Voyage
Type Shootout
Price £5.95
Publisher Foilkade, 0225 834981
Format Cassette
Outlets Mail order
Machine ZX81

Harrier Attack

Your mission here is to take off from an aircraft carrier in a Harrier fighter, fly inland avoiding enemy ground fire and missiles from their fighters.

Quick thinking and tactics will help you get a high score. On taking off, it's best to fly close to the ground, bombing what you can. You fly to the enemy base which you bomb, then fly back and land on the aircraft carrier.

Your ability to fly the aircraft depends on how well you control the keys. You score 200 for a tank or 750 for a patrol boat. If you land back on the ship successfully you're heralded by the ship's hooter and the offer of another sortie.

And if you tire of the sound, you can switch it off by typing zero using the left and right cursor keys.

There are five skill levels and after a few goes the mission is easily completed. All that's left is to score extra points. As the skill levels progress you have to fly further to enemy base.

Name Harrier Attack
Type Pilot
Price £6.95
Publisher Durell Software, Castle Lodge, Castle Green, Taunton, Somerset
Format Cassette
Outlets Mail order
Machine Oric

Centipede

Those nasty insects are at it again. This best-seller is based on the arcade version. A fast-moving centipede travels down from the top of the screen and you have to eliminate it before it gets you. Not only do you have to cope with the centipede, but you have to blast through a field of mushrooms, creepy spiders, itchy fleas and mushroom-laying bugs.

With three levels of play you can fire your way through the centipede's body, so it gets progressively shorter if you aim quickly enough.

There are good sound effects in this game. When you hit the centipede repeatedly it sounds as though you're firing a machine gun. And with good keyboard control you can clock up a high score.

It's a game well worth the money.

Name Centipede
Type Arcade
Price £4.95
Publisher PSS, 452 Stoney Stanton Road, Coventry
Format Cassette
Outlets Mail order, retail
Machine Oric

Adventure 200

The ingredients are here for a really gripping adventure. Disguised as a peasant you venture into the evil land of Grunlock to recover your King's stolen treasure. And you'd better not come back empty handed or the King will have you killed.

Starting west of the palace you give simple commands for directions you want to move. After every move, the ZX81 displays where you are, what's happened, and the obvious paths you can take.

During your journey you are offered several things, such as a lamp and a fish. And what you pick up affects your progress.

A very interesting adventure.

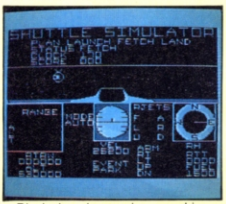
Name Adventure 200
Type Adventure
Price £5.95
Publisher Foilkade, 0225 834981
Format Cassette
Outlets Mail order
Machine ZX81

Space Shuttle

If you've always fancied yourself as a pilot, but just couldn't raise the cash to take lessons, the next best thing is this excellent flight simulation program from Microdeal.

But before you start revving up your engines read the manual carefully; after that it's plain flying. You're given points according to how well you perform each part of the operation.

The first stage is the launch. Controlling your shuttle with joystick and keyboard, there's a display of your progress in the bottom left corner, with a view from the windscreen on screen and instruments and readouts scattered around.



Displaying impressive graphics a satellite rescue mission comes after the launch into orbit. This is the easy part. The final re-entry and landing is where things can be disasterous but that'll depend on your skills. A splendid piece of software. You'll clock up lots of flying time with this one.

Name Space Shuttle
Price £8
Type Flight simulator
Publisher Microdeal, 0726 3456
Format Cassette
Outlets Mail order, most dealers

Vultures

A space invader type of game, but this time vultures are doing the dropping.

With a choice of slow, medium and fast speeds you use your joystick to avoid the shower of vulture droppings that come pelting down the screen. As you knock the birds off their perch your score is recorded at the top of the screen. But you'd better be quick because as they move in a zig-zag fashion down the screen they're coming at you faster.

If you manage to get rid of the flying birds you have to cope with — yes, you've guessed — super vultures which move even faster.

Name Vultures
Price £6.95
Type Arcade
Publisher J Morrison (Micros), 0532 480987
Format Cassette
Outlets Mail order and some dealers

Ring of Darkness

Treking through forests, lakes, rivers and other enchanting features your task is to find Shedir, the Ring of Darkness. But beware, lurking in the greenery are bandits, hidden dungeons and giant rats.

In this adventure, in sheer fantasy style, you make up your character's profile.

Before you start your journey, you're given gold, food and Hit and Experience points. The former measure your mortality when up against your enemies, and if you take too long in getting rid of them your Hit points diminish and die. Don't get too worried though, because if you're killed off the game has instant reincarnation and your character will pop up on another area of the map.

As you trot along, interesting landmarks are scattered about the countryside. As you enter some of them they turn into separate graphics routines.

With instant responses to your keyboard, entries options like Attack, Enter, Cast a Spell and Search are quickly dealt with. This is a colourful adventure and you'll need a lot of stamina if you want to solve it in one sitting.

Name Ring of Darkness
Price £10
Type Adventure
Publisher Wintersoft, 01-367 5720
Format Cassette
Outlets Boots, Dragon dealers, mail order

Everest

Fancy a bit of climbing? How about tackling Everest? Don't worry you won't need to buy a ticket to Nepal or too much leg work.

You lead a team of six and have three peaks to choose from. You decide whether to mount your expedition in the spring or autumn and you have a maximum of three weeks in which to complete the climb before bad weather continues.

With each climber able to carry 60lbs you have to distribute 1,800lbs of supplies between them. Fighting against avalanches and crevasses, you can also check at any time the weather forecast,

the strength of your climbers, what each man is carrying and the position of both the climbers and the assorted supplies you need.

The graphics are not superb but are quite amusing and come into effect when the climbers tramp between camps. And if you happen to conquer the mountain a percentage rating is given to show how well you coped with a particular climb at that particular season.

This game fills up those vacant hours.

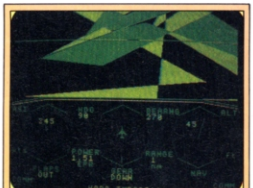
Name Everest
Price £7.95
Type Adventure
Publisher Salamander, 17 Norfolk Road, Brighton, East Sussex
Format Cassette
Outlets Spectrum shops, mail order

Tried and tested for the Dragon

NAME	TYPE	PRICE	PUBLISHER	FORMAT
Wizard War	Arcade	£7.95	Salamander	Cassette
Frogger	Arcade	£8	Microdeal	Cassette
Cuthbert Goes Walkabout	Arcade	£8	Microdeal	Cassette
Star Jammer	Arcade	£7.95	Salamander	Cassette
The King	Arcade	£8	Microdeal	Cassette
Hungry Horace	Arcade	£5.95	Melbourne House	Cassette
Android Attack	Arcade	£5.95	Microdeal	Cassette
Keys of the Wizard	Adventure	£8	Microdeal	Cassette
Intergalactic Force	Arcade	£8	Microdeal	Cassette
Lander	Simulation	£8	Microdeal	Cassette

Tried and tested for the BBC

NAME	TYPE	PRICE	PUBLISHER	FORMAT
View	Word Processing	£59.95	Acorn	Rom chip
Wordwise	Word Processing	£39.95	Computer Concepts	Rom chip
Monsters	Arcade	£9.95	Acorn	Cassette
Snapper	Arcade	£9.95	Acorn	Cassette
The Hobbit	Advent	£14.95	Melbourne	Cassette
GB Limited	Simulation	£6.95	Simon W. Hessel	Cassette
Frogger	Arcade	£6.90	A&F	Cassette
Starship	Arcade	£9.95	Acorn	Cassette
Arcadians	Arcade	£9.95	Acorn	Cassette
Planetoid	Arcade	£9.95	Acorn	Cassette



747 Flight Simulator

Name 747 Flight simulator
Type Pilot
Price £6.95
Publisher Doctor Soft
Format Cassette
Outlets Mail order

Flying lessons can prove a trifle expensive if you have a limited amount of money in your pocket. But with this flight simulator program you can get a taste of what it feels like, especially with its good graphics and sound effects.

Safely strapped in the cockpit of a 747 with your instruments before you, you can fly either to Heathrow or Gatwick. If flying from one airport to another is too much of a challenge, you can make a couple of quick circuits of the airport and land where you started from.

You start off with the plane on auto-pilot. A touch on the + key turns up the power and you roll down the runway gathering speed. As you do so the airport buildings flash by the windows, and at around 120 knots and power at 1.50 you rotate and lift off.

Then you start your landing approach — throttle back on the power, put the flaps out, lower the landing gear and drop the power level to around 1.03. You should aim to slow the plane to around 140 knots to land it successfully.

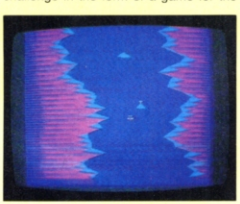
For budding pilots this is the best flight simulator around that runs on the Beeb.

Canyon

Name Canyon
Type Pilot
Price £10
Publisher BBC, 35 Marylebone High Street, London W1
Format Cassette
Outlets Mail order, retailers

Imagine yourself stuck deep in a canyon (Grand or otherwise) being chased by missiles, planes, mines, gates of fire and all other manners of terror.

It's not, perhaps, too pleasant a prospect, but all the same it represents a great challenge in the form of a game for the



Beeb. The object of this game is simply to stay alive — dodging the sides of the canyon, avoiding the bombers and generally keeping your plane on the straight and narrow.

There are 64 possible variations on the basic game which control the width of the canyon, the speed of your plane and the number of enemy fighters coming after you. The instructions are clear and well written; when you've become an experienced canyon flier you skip through them and go straight to the game.

The use of colour and sound is consistently good and the game is responsive and entertaining. Because it allows you to improve steadily, it should hold your interest longer than the usual maze game. This game is highly recommended.

Escape from Orion

Name Escape from Orion
Type Arcade
Price £6.75
Publisher Hopesoft, Hope Cottage, Winterbourne, Newbury, Berks
Format Cassette
Outlets Mail order

If you've played Donkey Kong you'll feel at home with this one. You spend your time running up and down ladders and across platforms collecting things while an assortment of gremlins try and do you in.

You're landed in the top left-hand corner of the screen by a flying saucer. Then you have to scale the scaffolding, pick up an assortment of goodies and get back to your waiting vehicle and away unscathed.

Variety is provided by four different sets of scaffolding. You can choose which you'd prefer to climb. Variations within these include conveyor belts, a gremlin launching dead missiles, vertically moving platforms, electric doors which come down and trap you, and a gobbler which can dispense the ultimate penalty if given the opportunity.

This fast-action game seems a good investment for keen games players.

Starship Command

Name Starship Command
Type Strategy
Price £9.95
Publisher Acornsoft, 0223 316039
Format Cassette
Outlets Acorn dealers

In Captain Kirk style you take charge of the Starship Command as Starfleet Captain. Going where no human has set foot, you have to stop alien spaceships taking over the final frontiers of space.

This game will take time to learn, but it's well worth the effort. It's a one player game, but you can rig the odds a bit by giving either yourself or the enemy small or large torpedoes.

In a matter of minutes you're deep into space and surrounded by aliens. If you run into trouble, you hit the ejector button, and if you've scored over 90 points you've put back in a spaceship.

Up, Up and Away

Name Up, Up and Away
System Atari 400/800
Price £21.95
Publisher Pulsar Software, 051-236-6628
Format Disk/cassette
Language Machine Code
Outlets Mail order, Atari dealers

If you thought all flight simulators were the same, think again.

Up, Up, and Away puts you in charge of a hot-air balloon that roams over the gentle rolling green hills (of England?). The only problem with this seemingly tranquil scene is the appearance of various obstacles that attempt to drag the balloon from the sky, including a small brat with a slingshot (and dead-accurate aim), an errant acrobatic plane whose propeller always seems to lurk dangerously close to your balloon.

And you'll need to refuel every once in a while, or course.

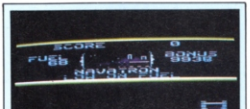
Pooyan

Name Pooyan
System Atari 400/800
Price £27.95
Publisher Datasoft USA distributed in UK by Centresoft, Centresoft House, Unit 16, Tipton Trading Estate, Bloomfield Road, Tipton, West Midlands DY4 9AH
Format Cassette
Other versions Commodore 64, Vic-20
Outlet Centresoft stocklists

In this game, you are a pig. Not the gluttonous human variety, but a real curly-tailed cutey attempting to escape from advancing hordes of lupine menaces (read wolves).

The old fairy tale has been updated here to include wolves in helium-filled balloons attempting to reach the piggies in peril. The piggies (of which you are the leader) are equipped with bows and arrows to shoot down the advancing hordes of wolves.

The game has excellent graphics (particularly the wolves who would make anyone's grandmother quake in her boots) and a sufficiently absurd concept as to be entertaining.



Fort Apocalypse

Name Fort Apocalypse
System Atari 400/800
Price £25.15
Publisher Synapse Software, USA
Format Disk or Cassette
Outlets Norwich Camera Centre, 20 White Lion Street, Norwich NR2 1QB, Tel (0620) 612537

Fort Apocalypse is actually a better than average version of the well-known Choplifter game. Piloting a Rocket Copter your mission is to enter and destroy Fort Apocalypse.

As you descend into the first level of defence you must rescue eight prisoners scattered all round the Fort. However, they don't come running into your waiting 'copter the moment you arrive.

You have to weave your way through a series of obstacles including caves, impact shields, hyper chambers and rotating field envelopes before you get to the Crystalline Caves that lead to the Fort. You get three selectable settings that determine the level of challenge — and a 'Navitron' miniature view of the immediate terrain.

The game starts with your yellow heliocopter hovering over a fuel station at which you must land to refuel. You soon enter dangerous territory spotted with floating mines and blue robochoppers chasing your copter.

This is a magnificent game in every respect.

Soccer

Name Soccer
Application Football game
System Atari 40 or 800 (1 to 4 joysticks)
Price £29.95
Publisher Thorn EMI 01-836-2444
Format Cartridge
Outlets Laskys and other major retailers

Probably the best computer football game for the Atari you're ever likely to see. The great advantage of this game is that it can be played by more than one person — and played very effectively at that.

You can have up to four joysticks, all on one side, two against two or any other perverse combination you can imagine.

You can also still play against the computer.

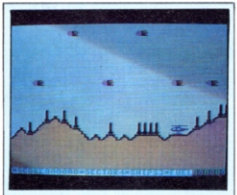
There are 22 animated players, a rolling ball, pitch-markings and all the regular football trappings.

The game is easy enough to play against other players (as long as you make sure you get in more practice before you let anyone else on it), but take care before moving onto play against the machine. There are only two levels of one-player action: hard and very hard.

This is a thoughtful and challenging interpretation of video football that deserves a place on any software shelf. It nicely overcomes the traditional problem of moving a live-action game effectively onto a computer.

Tried and tested on the Atari

NAME	TYPE	PRICE	PUBLISHER	FORMAT
Pacman	Arcade	£29.99	Atari	Cartridge
Centipede	Arcade	£29.99	Atair	Cartridge
Donkey Kong	Arcade	£29.99	Atari	Cartridge
Home Filing System	Filing	£39.99	Atari	Cartridge
Atari Writer	Word Processing	£65.00	Atari	Cartridge
Asteroids	Arcade	£29.99	Atari	Cassette
Paint	Artist's	£29.99	Atari	Cartridge
Jumbo Jet Pilot	Simulation	£6.95	Thorn	Cassette
Carnival Massacre	Arcade	£6.95	Thorn	Cassette



Scramble

This game is a version of the arcade classic Scramble, and will be just up your street if you like low flying and bombing.

You pilot a ship low over mountainous terrain bombing helicopters, enemy missile bases and rockets. All your targets are displayed on a smoothly scrolling screen as well as your score, sector, ships left and fuel level.

Coping with caves where the floor and ceilings rise and fall, as well as meteor storms and a skyscraper city, keeps your wrist busy on the joystick. And if you manage to get past the eight sectors you'll reach your ultimate goal — the enemy's command centre.

It's an exciting game with good graphics and plenty to do.

Name Scramble
Price £9.20
Publishers Supersoft, Winchester House, Canning Road, Wealdstone, Harrow
Format Cassette
Outlets Mail order and most dealers

Hover Bovver

Here's an original piece of software that will give you lots of laughs. It got top marks in a full review in *PCN* Issue 27, and once you start there's no stopping you.

You're an ardent gardener and love to keep your lawn in tip-top shape. But there's one slight problem — you haven't got a mower. So you borrow Jim's, after all what are neighbours for.

Peacefully you mow your lawn with your faithful mutt Rover trotting at your heels. But then all hell breaks loose, because Jim wants his mower and you've not finished. Before you know it Rover is at Jim's heels and you've just mowed a prize flower bed and the gardener is after you.

In Keystone Kops style the chase is on tackling 16 different lawns doging flower beds and hedges to avoid Jim.

Name Hover Bovver
Price £7.50
Publisher Llamasoft, 49 Mount Pleasant, Tadley, Hants
Format Cassette
Outlets Dealers

Jumpman

A game that can get you breathless trying to save Jupiter Headquarters from destruction. In *PCN* Issue 21 it clinched top marks and was classed as the best arcade game for the Commodore 64.

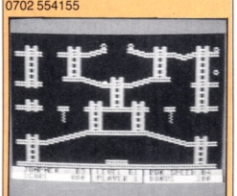
You have to be a bit of an athlete — climbing up and down ropes, ladders, girders, ducking from a hail of missiles, taking flying leaps into space and still find time to pick up treasures. You'll also need quick reactions.

Up to eight players can join in this leaping game. Each has three levels to choose from and a choice of eight playing speeds — from slow to suicidal.

Things can become a bit hairy if you opt for suicidal at advance level, especially if a ladder snaps in two after you've climbed it, two girders don't join or treasures hang in mid-air beyond reach. You've just got to keep your cool.

In all, your joystick controlled man has to climb to the top of 31 levels of play before his mission is complete. With a manual that gives you useful hints and tips for clocking up your score, there's no doubt that even at £27.50 it is money well spent.

Name Jumpman
Price £27.50
Publisher Epyx
Format Disk
Outlets Maplin Electronic Supplies, 0702 554155



Monopole

This game bears more than a slight resemblance to the old family board game Monopoly. And with impressive graphics and sound it will certainly give you a run for your money.

Your aim is to accumulate as much wealth as you can, and make your opponent bankrupt. Out go all the physical aspects of the game, such as handling money and moving your tokens, because the computer does it for you.

At the end of each move, you are told where the players are and how much cash they have. If you happen to land in jail, police sirens accompany you to your cell.

Although the instructions are a bit scanty, at every stage of the game you are given options to help you decide the best tactics. For instance, when you land on an unsold property, full details are given about it rental potential, whether any others in the set are sold, its price and how much cash you have. Old faithfuls Community Chest, Chance and Free Parking are there for the taking to add a bit of spice to the game. But unlike its original counterpart only two can play.

Name Monopole
Price £9.95
Publisher Rabbit Software, 01-863 0833
Format Cassette
Outlets Mail order

Tried and tested on the 64

NAME	TYPE	PRICE	PUBLISHER	FORMAT
Grand Master	Chess	£17.95	Audiogenic	Cassette
Matrix	Arcade	£8.50	Llamasoft	Cassette
Benji-Space Rescue	Arcade	£18.23	Epyx Inc.	Disk
3-D Glooper	Arcade	£8.00	Supersoft	Cassette
Escape -MCP	Arcade	£5.99	Rabbit	Cassette
Cyclons	Arcade	£5.99	Rabbit	Cassette
Hustler	Arcade	£5.99	Bubble Bus	Cassette
Motor Mania	Arcade	£8.95	Audiogenic	Cassette
Planet Fall	Advent	£34.95	Infocom	Disk

DATABASICS

PCN Databasics is presented in three-week cycles. This week it's the turn of software packages, next week hardware, and two weeks from now, peripherals.. We can't fit all software packages in, so we've compiled a selection, giving best sellers from 100 publishers and distributors.

We confined coverage to five main types of applications: business, education, games, home and utility. All details published are the latest available.

Companies wanting to add their best-selling packages to Databasics, or wanting to update information already here, should send details to: Databasics, *Personal Computer News*, VNU, 62 Oxford Street, London W1A 2HG.

APPLICATION Each software package is listed alphabetically by its application.
PRICE includes VAT.
MACHINE/OPERATING SYSTEM on which the best selling packages runs.
OTHER VERSIONS indicates whether or not the package runs on a different machine or operating system.
MEDIA SUPPLIED indicates in what format the package comes — either cassette, disk, or cartridge.

MAIL ORDER AVAILABLE tells you whether or not the package is available by mail order.
HARDWARE REQUIRED shows the need for special hardware, such as disk drive, joystick or printer.
PUBLISHER/DISTRIBUTOR This code refers to the distributor code table at the end of the listings, which will give the name and telephone number of the publisher/distributor.
COMMENTS — any other points of interest.

SOFTWARE

	Price inc vat	Machine/ Operating System	Other versions	Title	Memory required	Media Supplied: Cassette	Media Supplied: Disk	Media Supplied: Cartridge	Mail order avail	Hardware Required: Disk drive	Hardware Required: Joystick	Hardware Required: Other	Publisher/ Distributor	Comments
WORD PROCESSING														
	£92.00	Apple II		Piewriter	48K		●		●	●		●	M5	Needs 80 column card. Allows entry, editing & print formatting of any text type.
	£125.35	Apple II		Wordhandler	48K		●		●	●			P4	Word processor for the non-professional — minimum Apple system.
	£17.25	BBC Model B		Wordsworth	32K	●	●		●	●			I7	Disk version £19.50; cheap word processing package.
	£152.95	Apple III	●	Apple Writer 2	48K		●			●			P6	Also Apple II. Has word wrap, glossary & word processing language.
	£28.50	BBC Model B		Alphabeta	32K	●			●				H3	Also available on disk. Suitable for home & business.
	£10.50	BBC Model B		Word Pro	32K	●			●				I4	Includes DELETE, INSERT, SAVE, Date etc.
	£90.85	Commodore 64		Infomast	64K		●		●	●			R2	Combined programmable word processor, Database and calculator.
	£89.00	Commodore 64	●	Paperclip	64K		●		●	●			K5	Also Commodore 8000. Compatible with WordPro & SpellPro.
	£488.75	Commodore 8000	●	Wordcraft	32K		●			●			D1	Also on SuperPet, Sirius 1, IBM PC & CBM 64. Routine correspondence, mailing, etc.
	£51.75	Commodore Pet	●	Papermate +	16K	●			●				S5	Also on Commodore 64, 3, 4, & 8000. Available on floppy (£53.49).
	£145.00	CP/M	●	Mail Merge	64K		●			●			X1	Also on CP/M 86 and PC-DOS. An optional MERGE, PRINT, extra for Wordstar.
	£295.00	CP/M	●	WordStar 3.3	56K		●			●			M10	Also on IBM PC, MS-DOS. Integrates with CalcStar, InfoStar, Mail Merge, SpellStar.
	£287.50	CP/M	●	Peachtext	48K		●			●		●	P1	Also MP/M & MS-DOS. Needs high quality printer. Contains proof reader.
	£339.00	CP/M	●	Perfect Writer/Speller	64K		●		●	●			S3	Also MS-DOS & Apple DOS. Contains quick reference card.
	£431.25	CP/M	●	Select Word Processing System	64K		●		●	●			B1	Also MP/M & PC/DOS. Screen-oriented system.
	£316.25	CP/M	●	Spellbinder	48K		●		●	●			E1	Also on Oasis. Word processing & office management system.
	£333.50	CP/M		WP2020	48K		●		●	●			G2	Menu-driven, machine independent. Set of key-tops provided.
	£225.00	IBM PC		Easywriter II	64K		●			●			X1	Bold face & underscoring on screen. 80,000 word spell checker extra (£43.15).
	£340.40	IBM PC		VisiWord	64K		●			●		●	R6	Mail merge facility with Visi file.
	£339.25	MS-DOS	●	WordStar	128K		●			●		●	A1	Also on CP/M. Needs printer. Complete screen-based WP.
	£40.25	Newbrain		Word Processor 40/12	32K	●			●				E2	Automatic word wrap, editing, saving paragraphs, deleting.
	£325.00	OS9		Stylograph	32K		●			●			S6	Expandable system with modular design.
	£45.42	Sharp MZ804	●	Wordpro	48K	●			●				K1	Also on MZ80B + K. Available on disk (£91.94). One of few WP packages for Sharp.
	£49.95	Tandy TRS 80 I	●	AJ Edit	32K		●		●	●		●	M6	Also on Genie I & II. Needs printer.
EDUCATION														
Basic Course	£13.95	Texas Instruments 99/4A		Teach Yourself Extended Basic	16K	●			●				T5	Needs extended Basic module.
Business Game	£9.95	BBC Model A	●	Business Game	16K	●			●				W1	Also on Model B. Two games for economics, business & general studies, teaching.
	£5.95	BBC Model B	●	Inkosi	32K	●			●				C9	Also on Vic-20. Rule for ten years, overcoming obstacles, e.g. famines.

	Price inc vat	Machine/ Operating System	Other versions	Title	Memory required	Media Supplied: Cassette	Media Supplied: Disk	Media Supplied: Cartridge	Mail order avail	Hardware Required: Disk drive	Hardware Required: Joystick	Hardware Required: Other	Publisher/ Distributor	Comments
Chemistry	£14.38	Research Machine 380Z	●	Symbols To Moles	31K		●		●	●			H4	Also on Apple II. Practise using chemical symbols, writing & mole concept.
Children	£37.89	Apple II		Bumble Plot	48K		●		●	●			P4	A set of five programs for developing graphics and maths skills. For children 8 to 13.
	£29.84	Apple II	●	Face Hanger	48K		●		●	●			P4	Also on IBM PC. Designed for children to learn computer keyboard by building up face.
	£37.89	Apple II		Gertrude's Secret	48K		●		●	●			P4	An educational game to teach logical thinking & planning. For children aged 6-9.
	£9.80	Atari 400	●	Jigsaw Puzzles	16K	●							T4	Also on Atari 800. Has 16 puzzles and optional difficulty.
	£9.95	BBC Model B		Letters	32K	●			●				C9	Designed for children aged 4-6 & for dyslexic & remedial children.
	£9.95	BBC Model B	●	Metrics	32K	●			●				C9	Also on Vic-20+ Spectrum. Structure of metric system, for children aged 10-15.
	£5.95	BBC Model B	●	Pascal	32K	●			●				C9	Also on Vic-20. Shows construction of Pascal Triangle and tests on it.
	£5.95	BBC Model B	●	Sequences	32K	●			●				C9	Also on Vic-20. Demonstrates number patterns.
	£6.50	BBC Model B		The Early Stages	32K	●			●				H3	Reading aid. Plays nursery rhymes. Available on disk.
	£4.50	BBC Model B		Super Hangman	32K	●			●				I4	Version of famous game. High resolution graphics. 800 words or enter own choice.
	£9.95	BBC Model B		Tree of Knowledge	32K	●			●				A9	Interactive program teaching categorisation. Simplified information retrieval.
	£4.95	Sharp MZ80A	●	Giant Maths	32K	●			●				S8	Also on MZ80K. Big screen figures & humorous error messages. 5 to 11 years.
	£4.95	Sharp MZ80A	●	Rocket	3K	●			●				S8	Also on MZ80A. Four difficulty levels. For five to 11 year olds.
	£9.20	Sharp MZ80A	●	Teach Tables	48K	●			●				K3	Also on MZ80K. Plays like game but motivates children to improve their ability.
	£4.95	Sharp MZ80K	●	Master Builder	48K	●			●				S8	Also on MZ80A. Repair a wall using random blocks. Teaches spacing.
	£5.25	Spectrum		Alphabet	48K	●			●				W2	'Picture for each letter of the alphabet. Option for lower case.' Aimed at ages 2-6.
	£5.25	Spectrum		Adding and Subtracting	16K	●			●				W2	For children aged 3-7. Three animated programs with full graphics.
Classroom Monitor	£322.00	UCSD-P	●	Classroom Monitor	64K		●		●	●			K4	Also on Apple II. Provides demonstration facilities & monitors student's progress.
Economics	£28.75	Sharp MZ80K	●	Broadwater Economics Simulation	16K	●			●				W1	Also on Commodore Pet & BBC. Simulates micro & macro economics.
French	£14.38	Research Machine 380Z	●	Repondez	31K		●		●	●			H4	Also on Apple II. Practising French verb formation (present tense).
	£9.20	Sharp MZ80A	●	French Conjugate	48K	●			●				K1	Also on MZ80K. Automatically conjugates regular verbs into tenses.
	£9.20	Sharp MZ80A	●	French Verbs	48K	●			●				K1	Also on MZ80K. Allows user to impart up to 20 verbs & eight tenses at a time.
Graphics	£8.00	BBC Model B	●	Painter	32K	●			●				A5	Also on Spectrum (£5.75), Atom (£6.90) & on disk.
	£9.95	BBC Model B		Creative Graphics	16K	●			●				A9	Book available (£7.50). Designed to illustrate BBC graphics.
History	£20.13	Sharp MZ80A	●	Kings & Queens	48K	●			●				K1	Also on MZ80K. Facts & figures on English monarchs since 1066.
Languages	£7.95	Sharp MZ80A	●	Multilinguist	3K	●			●				S8	Also on MZ80K. A language tutor to suit all European languages.
Mathematics	£8.95	BBC Model B		Angle	32K	●			●				C9	Also on Spectrum. Includes four programes designed to teach simple geometry.
	£9.95	BBC Model A	●	Algerbraic Manipulations	16K	●			●				W1	Also on Model B. Includes four programs designed for use in maths teaching.
	£82.80	IBM PC		Fact Track	64K		●			●			I3	Learning basic arithmetic. Presents simple two-line sums in random order.
	£9.20	Sharp MZ80A		Directed Numbers	48K	●			●				K3	Also on MZ80K. Teaches difficult mathematical functions.
	£9.20	Sharp MZ80A	●	Divisor Advisor	48K	●			●				K3	Also on MZ80K. Teaches division at a variety of skill levels.
	£27.60	Sharp MZ80A	●	Numerical Integration	48K	●			●				K3	Also on MZ80K & B. Teaches Simpson's Rule.
	£5.25	Spectrum		Counting	16K	●			●				W2	Graded programs. 'Good as a first introduction to numbers.' Aimed at ages 3-6.
Meteorology	£23.00	Research Machines 380Z	●	Weather	31K		●		●	●			H4	Also on Apple II. Gives synoptic charts. Teaches elementary meteorology.
Morse Code	£9.20	Sharp MZ80A	●	Morse Tutor	48K	●			●				K3	Also on MZ80K. Used to teach morse code by sight and sound. At seven levels.
Physics	£14.38	Research Machines 380Z	●	Lenses	31K		●		●	●			H4	Also on Apple II. Illustrates formation of images by lenses using ray diagrams.
	£3.00	Sharp MZ80A	●	Physics 1 and 2	20K	●			●				D6	Also MZ80K. O' level electricity and motion.
Typing	£28.75	CP/M	●	Touch'n'Go	48K		●		●	●			C6	Also on MS-DOS. Typing tutor for mastering numeric pad & Qwerty keyboard.
	£31.05	IBM PC		Typing Tutor	64K		●			●			I3	Presents exercises for learning touch typing or for improving existing skills.
GAMES														
Adventure	£17.95	Atari	●	Arrow of Death	16K	●			●				C8	Also runs on TRS-80, BBC, Vic-20. A 'classic text adventure'.
	£7.99	BBC Model B	●	Adventure	16K	●			●				M7	Also runs on Atom. 'Many rooms to explore and many hazards to overcome'.
	£7.95	BBC Model B		3D Deep Space	32K	●			●				P10	You're in a starship defending the stargate to your galaxy.
	£6.95	Dragon 32		Death Cruise	32K	●	●		●	●			V1	'Adventure game set on the high seas'.
	£7.95	BBC Model B		Hunchback	32K	●	●		●	●			S15	Little man runs along walls avoiding obstacles.
	£9.95	BBC Model B		Sphinx	16K	●			●				W1	'A classic adventure, moving through caves avoiding hazards to collect treasure'.
	£24.99	Commodore Vic-20		River Rescue	8K			●			●		T4	Needs joystick. 'Captain boat through treacherous rivers to rescue explorers'.
	£7.50	Commodore 64	●	Gridrunner	64K	●			●		●		L2	Also on Atari and Vic 20.
	£7.50	Commodore 64		Hovver Bovver	16K	●			●		●		L2	Man mowing the lawn is chased by his neighbour.
	£5.95	Commodore 64	●	Horace & the Spiders	68K	●			●				M8	Also on Spectrum and Dragon 32.

	Price inc vat	Machine/ Operating System	Other versions	Title	Memory required	Media Supplied: Cassette	Media Supplied: Disk	Media Supplied: Cartridge	Hardware Required: Main printer avail	Hardware Required: Disk drive	Hardware Required: Joystick	Hardware Required: Other	Publisher/ Distributor	Comments
	£8.00	Dragon 32		Mansion Adventure	32K	●			●				M12	'Wind your way through an old mansion picking up clues to find the diamond',
	£7.95	Dragon 32		Wizard War	32K	●			●		●		S7	Needs joystick. 'Magical combat for two to nine players; interactive duel'.
	£35.00	IBM PC		Adventure in Serema	64K		●					●	I3	Needs colour graphics adaptor and direct drive colour monitor for use.
	£6.90	Oric	●	Zodiac	16K	●			●				A5	Also runs on Atom. 'A thinking persons adventure game'.
	£12.07	Sharp MZ80A	●	Adventure	48K	●			●				K1	Also runs on Sharp MZ80B and MZ80K. 'An interactive adventure game'.
	£7.95	Sharp MZ80K	●	Nightmare Park	48K	●			●				S8	Also runs on MZ80A. 'Cross Nightmare Park. Every few steps play game or task'.
	£6.95	Spectrum		Luna Crabs	16K	●							M14	'Convincing 3-D graphics (PCN issue 33)'.
	£4.00	Spectrum		The Last Jedi	48K	●			●				A10	Textual adventure with over 500 rooms.
	£4.00	Spectrum		Dragon	48K	●			●				A10	Mission to recover Sword of Roac.
	£4.00	Spectrum		Kane	48K	●			●				A10	Mission to kill the great Dragon Smang.
	£14.95	Spectrum		Valhalla	48K	●			●				L1	PCN issue 35.
	£5.95	Spectrum		Manic Miner	18K	●			●				B3	Guide miner Willie through 20 crazy caverns.
	£5.50	Spectrum		Lunar Jet Man	48K	●			●				U1	Sequel to Jetpac — enhanced version.
	£5.95	Spectrum	●	Jetpac	16K	●			●				U1	Spaceman collecting pods and rockets.
	£5.95	Spectrum		Kong	48K	●			●				O3	Kong's got the girl — you go to her rescue.
	£6.95	Spectrum		3D Art Attack	48K	●			●				Q1	Girls rescue boys (or vice versa) in a maze filled with aggressive ants.
	£5.50	Spectrum		Heathrow ATC	16K	●			●				H7	Air Traffic Control game.
	£5.50	Spectrum		Churkie Egg	48K	●			●				A5	Also on BBC B. Try walking on the eggs.
	£6.95	Spectrum		Penetratol	48K	●			●				M8	Joystick optional.
	£5.50	Spectrum		Zoom	48K	●			●				I6	3-D fighter game with plane flying close to the ground.
	£5.50	Spectrum		Zip Zap	48K	●			●				I6	Concerns a non-stop robot which avoids aliens.
	£7.50	Spectrum		Halls of the Thing	48K	●			●				C11	Pretty straight forward — you avoid and kill monsters.
	£7.95	Spectrum	●	Flight	48K	●			●		●		P9	Also available on ZX81.
	£15.95	Spectrum		Scrabble	48K	●			●				P9	Expensive but popular.
	£14.95	Spectrum		The Hobbit	48K	●			●				M8	'Object is to get treasure. For one player. Also for Commodore 64.
	£5.00	Spectrum	●	Orb	16K	●			●				I5	Also runs on Dragon 32 and Commodore Vic-20. 'Explore labyrinth and destroy Orb'.
	£10.00	Spectrum	●	Pimania	48K	●			●				A7	Also runs on Sinclair ZX81, BBC 13, Dragon 32. Reviewed 18.3.83.
	£5.00	Spectrum	●	The Quest	48K	●			●				I5	Also runs on Dragon 32. 'Fighting adventure game'.
	£5.00	Spectrum	●	Star Trek	48K	●			●	●			I5	Also runs on Dragon 32 and Commodore Vic-20. 'Hunt down the Klingon in space'.
	£10.06	Tandy TRS-80 I	●	Mysterious Adventurer	16K	●			●				M6	Also runs on Tandy TRS-80 III, Genie I, II, Colour Genie and BBC B.
	£7.50	BBC Model B		Atlantis	32K	●			●				I4	'Guide submarine through caverns & destroy enemy'.
Arcade type	£9.99	Commodore Vic-20		Night Crawler	5K	●			●				R2	'A Centipede style game. Fast action, graphics and sound effects'.
	£5.50	Spectrum	●	Arcadia	16K	●			●				I6	Also on Commodore Vic-20. '12 levels of aliens attacking in different ways'.
	£4.00	Spectrum		Fozbee & the Hunny Suckers	48K	●			●				A10	Arcade game in 100% machine code.
	£5.95	Oric 1		Killer Caverns	16K	●			●				V1	'Involves running off with pieces of a ladder, hidden in the caverns'.
	£7.95	BBC Model B		Microbe	32K	●			●				V1	'Fast action game written in machine code'.
	£5.95	Spectrum		Quetzalcoatl	48K	●			●				V1	'Fast action game of strategy an skill involving small plane'.
	£6.95	Commodore 64		Falcon Patrol	48K	●			●		●		V1	'3-D maze game set on the high seas'.
	£5.95	Spectrum		Cyber Rats	16K	●			●		●	●	S9	Needs joystick and keyboard to run.
Asteroids type	£4.95	Spectrum		Meteor Storm	16K	●							Q1	'Progressive difficulty, variety of controls'.
	£6.95	Spectrum		Time-Gate	48K	●			●				Q1	'Time travel, 3D graphics, colour, cockpit view and instrument display'.
	£4.95	ZX81		Asteroids	4K	●			●				S9	'Fast moving, suitable for all ages'.
Ballooning	£14.95	Atari 400	●	Up Up Away	16K	●			●				S13	Reviewed in *PCN* week ending April 29. Also on Atari 800. Available on disk.
Centipede type	£7.99	Dragon 32		Caterpillar	32K	●			●		●		M12	'A new generation munching game'.
Chess type	£7.99	BBC Model B		Chess	16K	●			●				M7	'Machine code, high resolution graphics with many play options'.
	£24.95	Dragon 32		Cyrus Chess	32K			●					D3	'Won European microcomputer chess championship 1981. Nine levels of difficulty'
	£14.50	Sharp MZ80A	●	Chess	48K		●	●					K1	Also on Sharp MZ80B & MZ80K. '14 levels of difficulty'.
	£3.00	Sharp MZ80A	●	Bean Feast	20K	●			●				D6	Also MZ80K. Logic board game.
Darts	£19.99	Atari 400	●	Darts	8K	●						●	T4	Also on 800. 'Aim & throw — the computer does the arithmetic'.
Defender type	£22.80	Atari 400/800	●	Submarine Commander	16K			●		●			T4	'One player. Nine levels of difficulty. Destroy shipping. Oxygen levels, fuel etc'.
	£9.95	BBC Model B		Planetoid	32K	●			●				A9	'A game of speed & skill'. Available on floppy disk (£11.50).

	Price inc vat	Machine/ Operating System	Other versions	Title	Memory required	Media Supplied: Cassette	Media Supplied: Disk	Media Supplied: Cartridge	Mail order avail	Hardware Required: Disk drive	Hardware Required: Joystick	Hardware Required: Other	Publisher/ Distributor	Comments
	£9.99	Commodore Vic-20		Annihilator	3K	●			●		●		R2	'Based on Defender'.
	£6.95	Spectrum		Penetrator	48K	●			●				M8	'Two levels of difficulty difficulty'.
	£21.95	TI 99/4A		Parsec	16K			●	●				T5	'Increasingly difficult. After four onslaughts pass through to next stage'.
Flight Simulator	£22.80	Atari 400	●	Jumbo Jet Pilot	16K	●			●		●		T4	Also Atari 800. 'Ten difficulty levels. View through cockpit with flight instrumentation'
	£7.95	Spectrum	●	Flight Simulation	48K	●			●				S10	Also on ZX81 (£5.95). 'Shows control panel & control view'.
	£17.20	Tandy TRS-80	●	Jumbo	16K	●			●				M6	Also on Genie I, II & BBC Model B. 'Simulation of piloting a Jumbo'.
Football	£29.99	Atari 400	●	Kick Back	8K			●			●		T4	Also available on Atari 800. Needs joystick to run. 'Beat the high score'.
	£19.55	Atari 400	●	Soccer	8K			●					T4	Also on Atari 800. 'Aerial view of field.' Reviewed 11.3.83.
Frogger type	£5.50	Commodore Vic-20		Wacky Waiters	3.5K	●			●				I6	'Waiter serving drinks in hotel. Has to hop from lift to lift'.
	£9.99	Commodore Vic-20		Hopper	3K	●			●		●		R2	'A version of Frogger'.
	£5.95	Spectrum		Horace Goes Ski-ing	16K	●			●				S10	'Sequel to Hungry Horace. He must cross busy road, fetch skis & ski down slope'.
Golf	£7.95	Dragon 32		Golf	32K	●			●				S7	'For one or two players. Full handicapping system'.
	£3.75	Spectrum		Golf	16K	●			●		●		R3	'For one or two players. Choice of nine or 13 holes'.
	£3.75	Sinclair ZX81		Golf	16K	●			●		●		R3	'Similar to other golf games, in black and white'.
Helicopter	£24.95	Commodore Vic-20	●	Chop Lifter	8K			●	●		●		A3	Also on Commodore 64. Needs joystick to run. 'Vic version of USA's best-seller'.
Jigsaw	£14.99	Atari 400	●	British Heritage Jigsaw Puzzle	8K	●							T4	Also on Atari 800. 'Educational game with selective difficulty'.
Kong type	£7.95	Commodore Vic-20		Bonzo	8K	●			●		●		A3	'Workman dodges robots on split-level. Sound & full graphics.
	£8.00	Dragon 32		Donkey King	32K	●			●		●		M12	'Popular arcade game'.
	£9.95	BBC Model B		Monsters	32K			●					W1	'The player has to run up & down ladders & along walls, pursued by monsters'.
Maze type	£24.95	Dragon 32		Ghost Attack	N/A			●			●		D3	'The aim is to avoid & eliminate ghosts which roam a maze'.
	£8.00	Dragon 32		Jerusalem Adventure	32K	●			●				M12	'Aim is to get treasure & avoid being eaten'.
	£5.95	Spectrum		Hungry Horace	16K	●			●				S10	'Animated maze game with sound & full graphics'.
	£4.95	Spectrum	●	Mined-Out	48K	●			●				Q1	Reviewed in *PCN* week ending April 22. Also on Dragon 32.
	£5.95	Spectrum		Muncher	16K	●					●		S9	'A monster munching marathon'.
	£10.00	Sinclair ZX81		Mazogs	16K	●							B3	'Three levels. Find & collect treasure in a maze & escape'.
Pacman Type	£9.95	BBC Model B		Snapper	16K	●			●		●		W1	'Based on Pacman'.
	£9.50	Colour Genie		Chomper	16K	●							K2	'Based on Pacman'.
	£8.00	Dragon 32		Scarfman	32K	●			●				M12	'Based on Pacman'.
	£4.95	Spectrum		Gnasher	16K	●			●				R3	Joystick optional. 'Based on Pacman using Beano characters'.
Pool	£8.50	BBC Model B		Billiards	32K	●			●				H3	Available on disk. 'A game for all ages'.
	£5.99	Commodore 64		Hustler	48K	●			●				B6	Simulation of mini-pool game (PCN issue 33).
Racing	£7.95	Dragon 32		Grand Prix	32K	●			●		●		S7	'For one or two players, features eight Grand Prix tracks & 10 levels of difficulty'.
Science Fiction	£19.95	Apple II		Lunar Leeper	16K		●			●			S12	Reviewed in *PCN* week ending April 22.
	£5.95	BBC Model B	●	Invisible Man	32K	●			●				C9	Also on Commodore Vic-20. 'Aim is to shoot man who keeps disappearing'.
	£9.99	Commodore Vic-20		Quacker	3K	●			●		●		R2	'Aim is to shoot down ducks & rabbits on shooting gallery'.
	£19.95	Commodore Vic-20	●	Spiders of Mars	N/A			●	●				A3	'Popular game for the Vic-20'. Also on Commodore 64.
	£5.95	Spectrum		High Noon	16K	●			●		●		A6	'Clean up chaos & disorder in town'.
Space	£9.95	Dragon 32		Dragon Trek	32K	●			●		●		S7	'A version of Star Trek with ten levels of difficulty'.
	£5.95	Spectrum		Android Run	16K	●			●		●		A6	'Control android to shoot walls, kill mutants & reach central complex'.
	£5.50	Spectrum		Schizoids	16K	●			●				I6	'Space bull-dozer nudges shapes into black hole'.
	£5.95	Spectrum		Starship Enterprise	48K	●			●				S9	'Based on the classic Star Trek. Includes arcade action'.
	£4.95	Spectrum	●	Star Trek	48K	●			●				R3	Also on ZX81 (£3.95). 'One player, sound & full colour graphics strategy game'.
Space Invader type	£7.99	BBC Model B		Swoop	32K	●			●				M7	'Written in machine code with full colour & high resolution graphics'.
	£7.50	BBC Model B		Model B Invaders	32K	●			●				I4	'A Space Invaders game with high resolution & colour graphics'.
	£9.99	Commodore Vic-20		Orbis	3K	●			●		●		R2	'Based on Missile Command. Fast & colour'.
	£19.95	Dragon 32		Cosmic Invaders	N/A			●					D3	Joystick optional. '15 levels of difficulty'.
	£6.50	Spectrum		Destroyer	16K	●			●				I5	'Destroy the varying alien invaders'.
	£4.95	Spectrum		Intruders	16K	●			●				Q1	'Includes mutants, random saucers, bonus base & 14 different aliens. Sound & colour'
	£21.95	TI 99/4A		Invaders	16K			●	●				T5	'Based on Space Invaders. After every two screens a new character appears'.
	£3.95	Sinclair ZX81		Invaders	4K	●			●				S9	'Based on Space Invaders'.
Sport	£33.35	IBM PC		Decathlon	64K		●			●		●	I3	Needs colour graphics adaptor & direct drive colour monitor. 'For up to six players'.

	Price inc vat	Machine/ Operating System	Other versions	Title	Memory required	Media Supplied: Cassette	Disk	Cartridge	Mail order avail.	Hardware Required: Disk drive	Joystick	Other	Publisher/ Distributor	Comments
Strategy	£7.95	Dragon 32		Wizard War	32K	●			●				S7	Reviewed in *PCN* week ending April 8.
	£4.00	Spectrum		Advance to Mayfair	48K	●			●				A10	Play against your Spectrum. Supports printer.
Variety	£5.95	Commodore Vic-20		Innovation Cassette	48K	●			●				M8	'One tape containing seven games'.
	£5.95	Spectrum		Over the Spectrum	16K	●			●				M8	'One tape with 10 games. Defender to geometry, beginners to advanced'.
	£4.95	Colour Genie		Breakout	16K	●			●		●		M9	'Different levels of skill'.
Various	£6.95	Commodore Vic-20		Amok	5K	●			●				A3	'Chased by robots in enclosed room. Different levels of difficulty'.
	£24.95	Commodore Vic-20		Mutant Herd	8K			●			●		T4	'Protect a powerhouse from mutants. Enter their burrows & destroy eggs'.
	£6.90	Dragon 32		Dead Wood	32K	●			●				A5	'A game for all the family'.
UTILITIES														
Basic	£201.25	CP/M		Basic 80	48K		●		●	●			X1	Industry standard Basic.
	£235.70	CP/M		Basic Compiler	48K		●		●	●			X1	Companion to Basic 80. Allows programs to run faster.
	£121.90	CP/M	●	C Basic	64K		●			●			X1	Commercial Basic. Also on CP/M86 (£265.65).
	£213	Any Z80		X-Basic	48K		●			●			X1	Built-in matrix functions. Supports MP/M record locking. Graphics option.
Basic Upgrader	74.75	Commodore 64	●	VicTree	64K	●			●				S5	Also Commodore Vic-20. Also on floppy (£92.00). Adds 50 commands to Basic.
Card Index System	£215.05	Apple II	●	VisiDex	48K		●			●		●	R1	Also on IBM PC. Needs printer. One record/screen designed for cross-referencing.
	£178.25	CP/M	●	Cardbox	48K		●		●	●		●	C6	Also on MS-DOS. Needs 24×80 VDU & 100K disk storage.
Communications	£102.35	Apple II		ASCII Express — The Professional	48K		●		●	●		●	P4	Needs RS232. Asynchronous serial communications package.
	£448.50	Apple II		Editel	48K		●		●	●		●	O1	Needs modem. A Viewdata frame word processor designed to aid data editing.
	£626.75	Apple II		Owlsync 3780	48K		●		●	●			O1	A full IBM 3780 emulator package allowing communication up to 2400 Baud.
	£454.25	Apple II		Owltel	48K		●		●	●		●	O1	Needs modem. Allows access to Prestel & private viewdata systems.
	£149.50	Apple II	●	Terminal Utilities	48K		●		●	●			C1	Also on Apple IIE. Converts Apple II to intelligent terminal. Speeds of up to 9600 BPS.
	£57.50	CP/M		Xcopy 1.0	64K		●		●	●			X1	Disk copy utility for Cromemco machines. Copies 8" or 5¼" single/double sided.
	£454.25	CP/M	●	Micro-Linkline	64K		●		●	●			I2	Also on UCSD-P. Teletype comms for transferring datafiles.
	£575	CP/M	●	Bisync AC-3780	64K		●		●	●			E1	Also on MP/M & CP/M86. Micro to mainframe comms through IBM terminal emulation.
	£41.40	IBM PC		Asynchronous Communications	64K		●			●		●	I3	Needs asynchronous comms adaptor. Makes PC act as asyncs comms terminal.
	£117.30	IBM PC		IBM 3101 Emulation Program	64K		●			●			I3	Makes PC act as 3101 terminal provides 3270 emulations when connected to host.
	£638.25	IBM PC		PC SNA 3270 Emulation	128K		●			●		●	I3	Needs SDLL adaptor card makes PC act as IBM 3270 terminal.
	£22.43	Sharp MZ80A	●	Zen	48K	●			●				K1	Also MZ80K & B. Full Z80 editor/assembler.
	£115.00	IBM PC	●	Interlink	48K		●			●			T2	Also on Sirius, Apple II, Xerox, Osborne etc. Connects processors for downloading.
Database	£132.25	Apple II		DB Master	48K		●		●	●			M5	Available on hard disk. Allows 1K records over 100 fields. Report generation, etc.
	£224.25	Apple II		Informex Database System	48K		●		●	●			I1	Database system which can be used to & update info on any type of record.
	£402.50	Apple II	●	Mailist	48K		●		●	●		●	A4	Also for IBM PC & Corvus Concept. Requires hard disk. A networking product.
	£96.60	Apple III	●	PFS: File	48K		●			●			P6	Also for Apple II (£135.70). Used in tandem with PFS (£96.60).
	£217.35	Apple IIE		VisiTrend + VisiPlot	64K		●		●	●			R6	Also for CP/M. Graphic representation of data. Compatible with VisiCalc.
	£10.30	BBC Model B		Filer	16K	●			●				M7	Allows searching, sorting, saving & recovery of data.
	£201.25	CP/M	●	Dataflow II	56K		●		●	●			G1	Also on CP/M 86. Needs 160K disk space. Extract files to link with other systems.
	£295.00	CP/M	●	InfoStar	48K		●			●			M10	Also on IBM PC, MS-DOS. Integrates with WordStar and Calcstar.
	£201.25	CP/M		Datastaff	64K		●			●			X1	Data entry & retrieval system. Interfaces with WordStar.
	£499.74	CP/M		dBase II	48K		●		●	●			E1	Micro DBMS. Can be used for high level programming for a range of applications.
	£557.50	CP/M		Superfile	56K		●		●	●			S4	Multi-file database giving application package information.
	£166.75	CP/M		Supersort I16	64K		●		●	●			M10	A sort utility for handling various forms of data files. Mainframe-like additions.
	£1,840	CP/M	●	MDBS II	64K		●						T2	Also on CP/M-86, MS-DOS, Turbo DOS, Unix and Xenix. Mainframe-like facilities.
	£569.25	Commodore 8000		The Administrator	32K		●		●	●			S11	Applications generator. No programming involved.
	£68.42	Newbrain		Invoice & Credit Program	32K	●			●				E2	The invoice program allows you to put in your own information and design invoice.
	£29.32	Newbrain		Database 40/S	32K	●			●				E2	Information gatherer, stores large quantity of information & can be interrogated at will.
	£684.25	Sirius, IBM PC, MS DOS	●	Tomorrow's Office	128K		●		●	●			S11	Complete applications generator.
Debugger	£258.75	CP/M	●	Animator	64K		●		●	●			M11	Also on Unix & MS100S, interactive source level debugging tool for CIS-Cobol.
File Transfer	£132.25	CP/M		BSTAM	16K		●		●	●		●	X1	Needs common interface ports or modem access. Utility for transfering CP/M files.
Graphics	£34.50	Apple II	●	Graphic Utilities	48K		●		●	●			C1	Also for Apple IIe. Parameter driven machine code programs' high res graphics.
	£24.95	Atari		Constructor	48K		●		●	●	●		C8	Less experienced & new programmers can design animated sequences.

	Price inc vat	Machine/ Operating System	Other versions	Title	Memory required	Media Supplied: Cassette	Media Supplied: Disk	Media Supplied: Cartridge	Mail order avail	Hardware Required: Disk drive	Hardware Required: Joystick	Hardware Required: Other	Publisher/ Distributor	Comments
	£9.95	BBC Model A	●	Creative Graphics	16K	●			●				W1	Also for BBC model B.30 programs on cassette produce range of pictures & patterns.
	£24.95	BBC Model B		EDG Graphics Package	32K	●			●				S7	Computer aided design package. Reviewed 11.3.83.
	£50.60	CP/M		CP/M Graphics	64K		●			●			D4	Range goes up to £421.70 & conforms to GKS Graphics Standard.
Language	£488.75	CP/M	●	CIS Cobol	64K		●		●	●			M11	Also on Unix. Compact, interactive ANSI 74 standard implementation of Cobol.
	£1,109.75	CP/M	●	Level II Cobol	96K		●		●	●			M11	Also on Unix & MS-DOS. High level ANSI 74. Compiler, mainframe-compat code.
	£396.00	CP/M		Fortran 80	48K		●			●			T2	Useful for scientific applications, where Pascal is ineffi cient.
	£285.20	CP/M	●	Pascal — MT+	64K		●			●			X1	ANSI standard Pascal for Z80 processors. Also on CP/M 86 (£484-90).
	£210	CP/M	●	Supersoft C Compiler	48K		●		●	●			M4	Also on CP/M-86, MS/DOS, PC. DOS. Fast implementation of C.
	£114.43	Commodore 64	●	DTL-Basic Compiler	32K		●		●				D1	Also on Commodore 8000, 4000 & 3000. Also tape version on CBM 64 (£39.96).
	£253.00	CP/M	●	ProPascal	56K		●		●	●			E1	Also on CDOS. Needs two disk drives. Native code Pascal.
	£40.19	Sharp MZ80A	●	Forth	48K	●			●				K1	Also on MZ80K & Osborne. Allows implementation of Forth.
	£25	Spectrum		Hisoft Pascal	48K	●							H5	Reviewed in *PCN* week ending April 8. Pascal compiler and screen editor.
	£421.70	Any 8 or 16 bit machine		PL/1	48K		●			●			D4	A compact implementation based on ANSI standard general purpose subset of PL/1.
	£172.50	UCSD p-System		UCSD Pascal	48K		●		●	●			D4	Portable Pascal for systems development or commercial applications.
Operations	£59.80	CP/M		Operating Guide	48K		●		●	●			E1	Works by putting CP/M to sleep & replacing it with operating environment.
Operating system	£22.94	Apple II		Fasdos	48K	●			●				P4	Disk operating system for Apples which speeds up location of binary & Applesoft files.
	£277	8086 micro		Concurrent CP/M-86	48K		●			●			T2	Enables four separate tasks to run in a single user station.
	£126.50	8080 and Z80 micros		CP/M 2.2	64K		●			●			D4	O/S for 8-bit micros with over 1.5 million users.
	£379.50	8080 and Z80 micros		MP/M	64K		●			●			D4	Multiuser, multitasking. Features record & file locking, date & time stamping etc.
	£210.80	8086 and 8088 micros		CP/M-86	64K		●			●			D4	Manages up to one megabyte of RAM & allows up to 128 megabytes of on-line storage.
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	£126.50	CP/M	●	Forms-2	64K		●		●	●			M11	Also for Unix & MS-DOS. Programming tool, for generating Cobol code.
	£379.50	CP/M	●	Last One	64K		●		●	●			S3	Also on MS-DOS and Apple DOS.
Programming Tool	£2,500	Apple II	●	Pascal Isam/Pascal Form	48K		●		●	●			A4	Also on IBM PC & Corvus Concept. Needs Corvus hard disk. Pascal prog tool.
	£287.50	CP/M	●	Fileshare	48K		●		●	●			M11	Also on MP/M. Bank-switched memory or CP/M network.
	£7.95	Dragon 32		Dragon Selection 2	32K	●							D3	Four utility programs which can be listed to see how the program works.
	£4.00	Sharp MZ80A	●	Tape Copier	48K	●			●				D6	Back-up copier for BASIC and machine code.
Telex	£2,113.70	Superbrain		Micro Telex	64K		●		●	●			E1	Also on Televideo 802. Enables automatic sending-receiving or telex by micro.
Testing Tool	£95.82	CP/M 80	●	Diagnostics II	32K		●		●	●			M4	Also on CP/M-86 and MS/DOS. Tests systems.
Time Recording	£862.50	Commodore 8000	●	Minuteman	32K		●		●	●			C4	Also on Commodore 4000. Time recording system. Can produce range or reports.
	£402.50	CP/M-86	●	Time Recording System	64K		●		●	●			D2	Also on CP/M 80. Control over man/hour expenditure by job or account number.
Utilities	£23.00	Apple II	●	Computech Utilities Disk II	48K		●		●	●			C1	Also on Apple IIe. Error checking, copying. Single disk copy. Label disk.
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Peter Worlock finds the Commodore 64 infinitely more manageable when equipped with BC Basic.

All change

The standard of Basic that comes built-in to the Commodore 64 has almost become part of microcomputing mythology, like Sinclair delivery times or Acorn's second processors. To be blunt, it's lousy.

In fact, if the market for the machine was anything other than the reality — *ie* almost masochistic enthusiasts — the 64 might almost have died because of this weakness.

Cynics will undoubtedly point to Commodore's own remedy, Simons Basic, as simply an excuse to charge £50 for something that we should have got in the standard price. But there are alternatives now, and BC Basic is undoubtedly one of the best.

Features

What you get for the comparatively trivial sum of £15 is an enormous extension to Commodore Basic with nearly 100 new commands covering graphics, sound and general programming.

Very briefly, they let you define and control sprites with consummate ease; program sound from Basic without resorting to the dreaded POKE statement; and make use of the much-vaunted high resolution graphics — something I suspect few owners have done given the unwieldy requirements and tortuously slow speed of Basic.

Unlike Simons Basic, BC Basic has no toolkit features. So far as it goes this is fine: one of the criticisms of Simons Basic has been that it tries to cram too much into the package. However, BC Basic also prevents you from using most — if not all — of the toolkits available since the two will be competing for the same memory locations.

This means you can't have access to useful things like RENUMBER, MERGE and FIND routines for programs written in BC Basic.

Unlike toolkits, but like Simons Basic, BC Basic must be present in memory in order to run programs written using its commands. Although this is unlikely to present much of a problem in terms of memory requirements, it rapidly becomes tiresome when developing a program to first load BC Basic and then load the program. And to have to do that every time you switch on the machine.

Presentation

The version tested came on cassette although a disk version is also available. The documentation looks uninspiring but turns out to be excellent.

What you get is a 56-page paperback crammed with information, starting with some handy background details on memory maps and suchlike, followed by a quick but helpful user's guide to some of the more interesting commands.

This is followed by a full glossary to the commands and functions available and the necessary syntax to allow you to use them.

In use

Nothing could be simpler. BC Basic loads in the manner of any other machine code program and neatly slots into place alongside the built-in language. It takes several minutes for loading and the program to set itself up, but after that you can start programming as usual.

One of the beauties of BC Basic is that the commands use a similar syntax to Commodore Basic and unlike some extensions, there are no funny keywords to learn. Initially it's like a dream come true and I doubt if you'll ever need to use POKE in a program written in BC Basic.

To use a familiar example — programming sprites — BC Basic almost makes them a pleasure to use. You can define them using the DEFSPR command and in binary too which means you can virtually make them up as you go along. There are commands for setting colour, position and priority, and even collision detection.

But it is perhaps in high-resolution graphics that the power of BC Basic becomes clear. Instead of the usual rigmarole necessary to set up and start using a high-resolution screen, you enter MODE 3,0: CLG and you're ready to go.

There are commands to plot points and draw lines as well as colour controls. You can also print text to the high-resolution screen. The only commands I would have liked to have seen which are absent are CIRCLE and FILL or PAINT.

As the icing on the cake you get not one but two high-resolution screens and you can draw on one while displaying the other. Author Brian Candler has thoughtfully provided a SCRWAIT command too, which waits until the raster scan is off-screen before switching between the two. What that means to you is that you can swap displays as rapidly as you like and there is no irritating screen flicker.

The sound commands are equally comprehensive and just as easy to use.

To cap the whole thing, all the new commands are error trapped and generate the usual, sensible error messages.

Reliability

In use BC Basic proved to be absolutely faultless. The only problem area is incompatibility with other programs.

Toolkits will not be the only programs affected. Driver routines for printers and the like are also suspect. If you decide you absolutely must have both at once, you should insist on a demonstration of the kit running.

Verdict

As a stand-alone piece of software, BC Basic is only a little short of superb. It is in the grander scheme of things that shortcomings exist.

Foremost among these must be the question of backup. The trouble with any software extension is that you are strictly limited to programs you write yourself unless the product achieves the status of a standard addition.

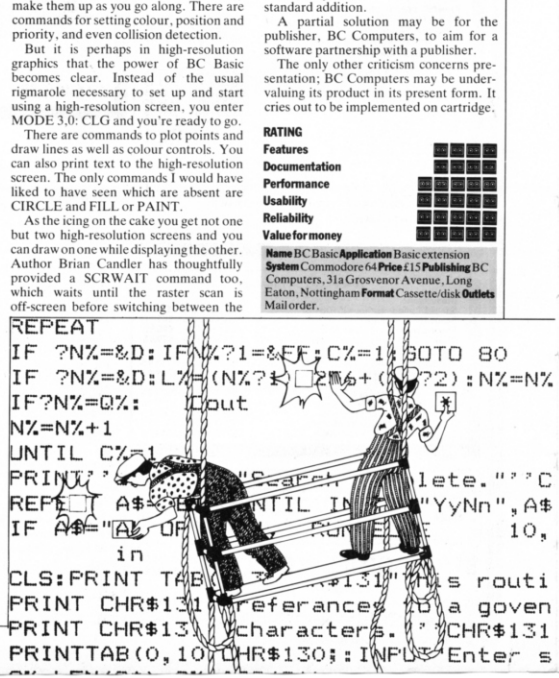
A partial solution may be for the publisher, BC Computers, to aim for a software partnership with a publisher.

The only other criticism concerns presentation; BC Computers may be undervaluing its product in its present form. It cries out to be implemented on cartridge.

RATING

Features	■■■■■
Documentation	■■■■□
Performance	■■■■■
Usability	■■■■■
Reliability	■■■■■
Value for money	■■■■■

Name BC Basic **Application** Basic extension **System** Commodore 64 **Price** £15 **Publishing** BC Computers, 31a Grosvenor Avenue, Long Eaton, Nottingham **Format** Cassette/disk **Outlets** Mail order.



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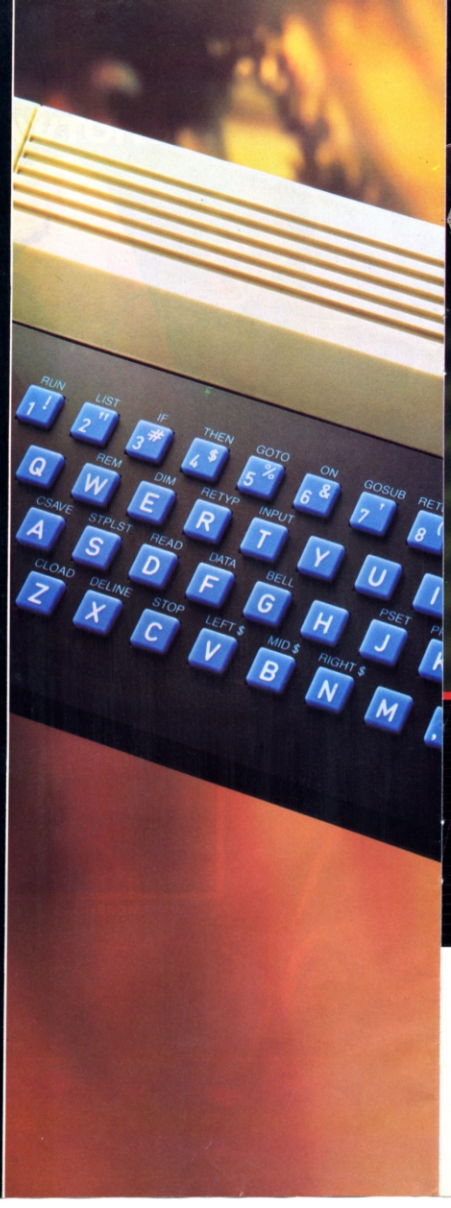

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For Dragon users with business needs, Deenagh Brook looks at new software from MST Consultants.

Dragon data jugglers

Many people hope they can use the Dragon for business, yet until recently there's been a dearth of useful business-type software, and too often packages that are available are badly-written.

The Dragon itself is not really designed as a business computer, so it's a bonus if you get real office use out of it. While far from being a toy, it's also not able to do everything a more sophisticated micro could do.

However, MST Consultants has produced both a database and a spreadsheet that could help to bridge this gap and give the Welsh beast a business application — or two.

MST-Calc

The spreadsheet comes as a cassette or disk; the one reviewed was the cassette version.

Documentation

At first glance, the documentation is disappointing. The words of wisdom are photocopied, and handwritten sections look sadly amateur. However, closer reading shows this software is worth serious attention as it appears to include many facilities offered by spreadsheets for larger business machines.

In use

It takes a long time to load, like all cassette programs, but is certainly worth the wait. Once loaded the flashing cursor can be moved around the matrix using the up, down, left and right arrows.

There are two modes: data entry or command, and getting from one to the other is done using the / key. Once in command mode, keys take on certain functions and you'll need to refer to the documentation.

The keys are:

S — store complete matrix
G — global command to format each field on the spreadsheet
F — format a single field
R — repeat a formula across a row or down a column
N — clear the spreadsheet
I — insert a row or column
D — delete a row or column
W — protect surrounding cells
C — calculate command
P — print spreadsheet to printer
E — exit program

The INSERT (I) and REPLICATE (R) commands are powerful tools for a spreadsheet of this kind. Too often you set up a lovely matrix and then wish to insert a new column or line.

As usual in spreadsheets, you set each cell required in the matrix. Cells can contain text, constants, or formulae. To create a formula you refer to other cells by, for example, A4 or B6 and not, as is often the case, by R1C3.

Another useful feature is the ability to format each cell so figures can be aligned in a printout or on the display. 'Whatif' operations can be carried out using the COMPUTE command and requesting automatic or manual calculation.

Verdict

This package is really no more limited than any calc-type program. The only real restriction could be the size of the matrix, which is 20 by 21 cells. However, this is unlikely to cause great problems for the majority of users. Another drawback is slow speed of calculation, but this is not bad enough to annoy. Overall, this is a very useful tool, well worth the money.

Database

For the first time user who doesn't want to get bogged down in file creation, this offers a simple file maintenance system for various uses.

Documentation

The instructions leave a lot to be desired, but having successfully loaded the program, you are taken through a series of menus. The main one consists of:

1 ADD record
2 CHANGE record
3 DELETE record
4 FIND/SORT records
5 LIST/PRINT records
6 TOTAL fields
7 CREATE new file
8 SAVE file
9 EXIT

A nice touch is that if the first operation performed is ADD record and a file has not been created, the program automatically creates a file.

All options are easy to use. The progam allows you to set up your own records. Fields within each record are defined and given a unique name followed by a type (alpha or numeric) and the length of the field.

This information is displayed on the screen, and if a wrong length is entered you must re-enter that length. You cannot define a field as having a length greater than 15 characters.

Once defined, the record is used as a simple form into which live data can be entered. To return to the main menu the @ key is pressed. As each record is entered it is automatically given a record number. Individual records can be accessed by key field or record number. They can also be printed out.

Once set up, the data file can be stored on cassette. Take care not to use the program tape accidentally as no check is made and the program can be wiped out in this way.

At the beginning of the program you are asked whether there's a file to load into memory. If a data file exists it is read from tape into memory and manipulations are carried out in memory, so response is fast whenever a search is carried out.

To find a record you choose a field and the program searches for it and, if found, displays it on screen.

There are a maximum number of nine fields in a record, which is not really enough. Just a name and address occupies at least four fields. Alpha fields are restricted to 18 characters, which will be adequate for most applications.

There is an option to produce totals on numeric fields, which sounds useful, but this turns out to be merely a total of all numeric fields for the whole file. To be of real use, subtotals are needed and totals of sorted records.

Although there is a reasonable facility to sort the records by a required field, nothing really useful can be done with a sorted file. Reports are a must in any file handling system, and there is often a need for a few salient details from each record, which is not possible with this package. A pity this, because it would not be difficult to produce the coding to do this.

The capacity of the package is:

File size .....up to 300 records, according to length
Record size .....nine fields
Field size .....alpha up to 18 characters.

Verdict

As a simple database this product is useful, and for the inexperienced programmer who wants limited files, such as names and addresses, it saves much work.

There are a few programs which claim to be databases, but it is worth noting that most are simply field handling systems.

Conclusion

For the money, these two packages are good value provided the user is not too ambitious. They are simple systems to make life easier for the first time user.

The database could be used to, say, set up a list of clients for a vet to remind him/her of animals names, but it would not be able to produce a report on all animals due for their parvo virus booster injection.

The spreadsheet, on the other hand, could be used to produce simple models of various situations and could be quite powerful.

Names Database/MST-Calc **Price** £19.95 (ea) **System** Dragon 32 **Publisher** MST Consultants, Newton Road, Bovey Tracey, Devon. TQ13 9BB 0626 832617 **Format** Cassette **Language** Basic **Outlets** Retail.

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DRAGON 32

In the money

Name Micropoly **System** Dragon 32 **Price** £5.95 **Publisher** Temptation Software, 58/59 Poland St, London **Format** Cassette **Language** Basic **Other versions** Vic 20 **Outlets** Mail order/retail

Based on that well known Monopoly board game, this I'm afraid comes in a very poor second. The game appears to be biased in the machine's favour and isn't without the odd irritating bug or two.

The cassette has a version for the Dragon on one side and side two is for the Vic 20.

The aim of the game, of course, is to make the most money by bankrupting all the other players. To do that you buy up property, build houses and hotels then rake in the cash.

In play

In the first game Dragon (it always goes first) went off with a series of doubles and managed to buy property from six of the available eight sets. This made for a dull game as no-one could build on their property until they could obtain a full set and the Dragon won't part with any of its own unless it goes bankrupt (property is then resold only to the bank at half price).

It was especially difficult with four players to manage without the real Monopoly board. The game is mostly text only; each player's throw, amount of money and where you land is displayed on screen. You're then informed whether the property is for sale or how much you owe and to whom.

After a complete round, you are offered a look at the board. These are the only graphics you get in the game and they are limited to solid colour CHR$ symbols, displayed on a very small board.

One frequent bug was that Chance and Community Chest cards weren't always read, although the consequences of the card (move, pay out or receive money) were often noticed.

For no apparent reason during a game a new player appeared, lasted one round, and then disappeared. Curiously he/she went the opposite way around the board to the other players.

The Dragon's addition was often suspect — one glaring example was 200+78 −100 = 234.

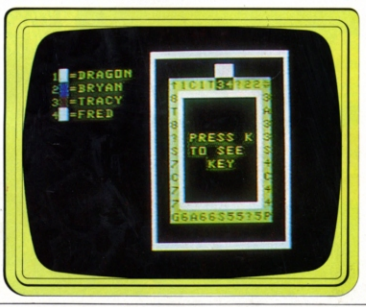
Verdict

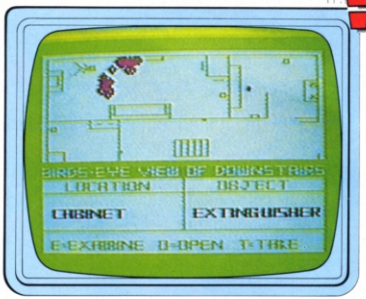
I found the game disappointing, but perhaps I'd expected too much. It loads in two parts, rules first (optional, but very easy to follow) then the game. I had a struggle to get both to load. Your Dragon acts as player, banker, dice thrower and scorer and, including it, up to five can play.

Unfortunately Dragon will buy whatever it lands on and no amount of coaxing will persuade it to sell or swap. I prefer the real board game. **Jim Ballard**

RATING

Lasting appeal	
Playability	
Use of machine	
Value	





Diary of danger

Name Pettigrew's Diary **System** Dragon 32 **Price** £7.95 **Publisher** Shards Software, 189 Eton Road, Ilford, Essex, IG1 2UQ **Format** Cassette **Language** Machine code/Basic **Other versions** None **Outlets** Retail/mail order.

An adventure game with a difference. The whole game is in three separate chapters — each an adventure in its own right — and each chapter must be completed before the next can be loaded.

In play

Chapter one of the game begins with you in the hallway of a farmhouse in which a fire has just started. Your position (initially in the hallway) is marked by a blue cross. The arrow keys control your movement.

The aim of this game is to find Pettigrew's Diary and pick up other items in order to progress to the second chapter. The man himself is lying on the floor of the room in which the fire started. If you approach him he will tell you the whereabouts of his notes, then you have to rush off to find them.

A floor-plan of the farmhouse is drawn out on the screen in hi-res graphics. There is a text section at the bottom which tells you what you are examining and what (if anything) is inside it. You have to examine things like cabinets, the wall safe and bins before you can open them and take what's inside.
inside.

As the fire spreads, its progress is marked by small red circles and a crackling sound.

You can move upstairs to take a quick look about, but the fire spreads quickly. It's a good idea to find the fire extinguisher at the start of the game and to use it as sparingly as possible, since if it runs out and you're in the middle of the inferno, you're fried to a crisp and have to restart.

Having found the clues, taken the right items and escaped, you are given a codeword to allow you access to Chapter 2.

This is a normal adventure using the familiar GO NORTH etc. You are based in London, and must travel around the city, collecting information rather than objects. There are several red herrings and pitfalls in this chapter. Eventually you'll gather what is necessary (a notepad is useful) and be given the code for the final chapter.

The final chapter is subdivided into eight tasks and again each must be completed before the next can be started. You move around Europe this time, and the emphasis is more on graphics than text.

As you complete each task, you are told a codeword which allows you to restart the adventure at a later date.

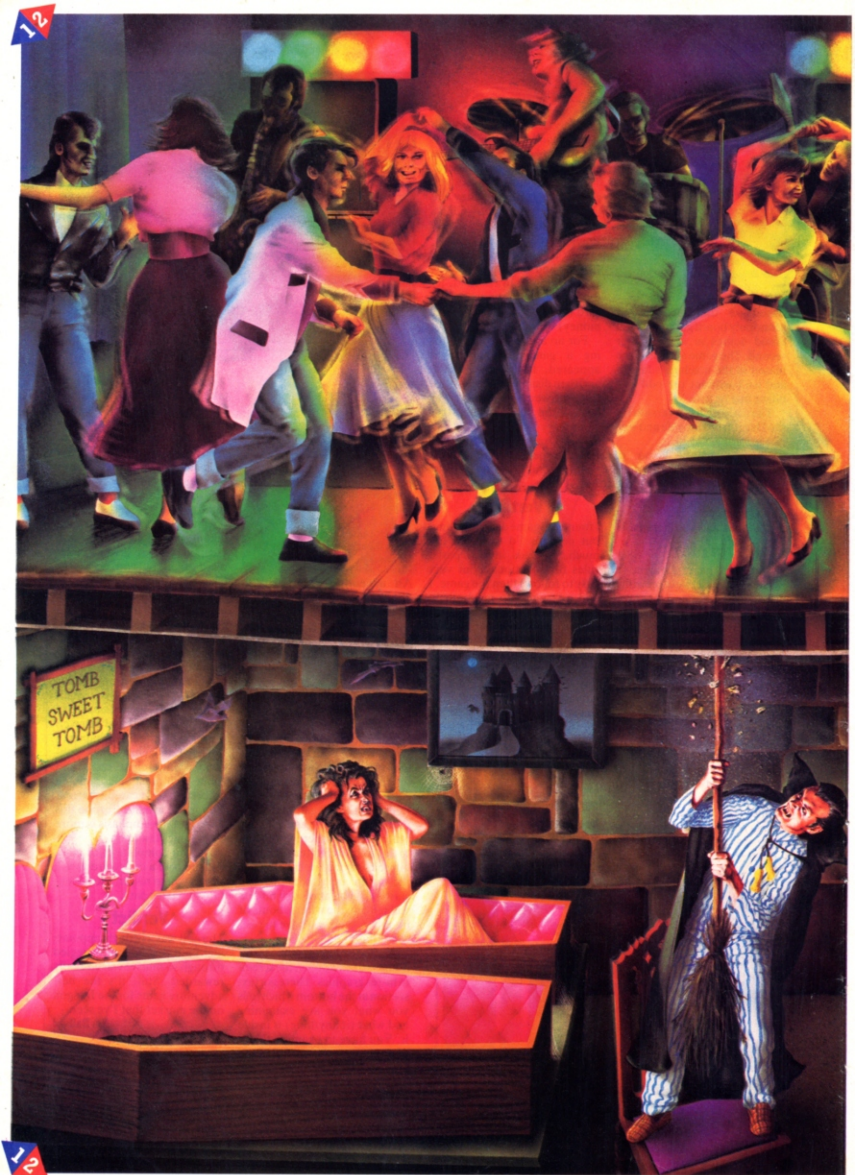
Verdict

The end was a little disappointing. I felt that having struggled through so much I wasn't really rewarded. Still, it's the best adventure game for the Dragon on the market that I've seen.

Jim Ballard

RATING

Lasting appeal	
Playability	
Use of machine	
Value	



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INVALID MOVE! SOUTH-- CMD

Nothing to do with Christmas, Snowball is a space ship near the end of its century-long voyage to Eridani A. But an act of sabotage has altered its course — directly into a star. Of course, with you on board, there's no need to get one's space suit in a twist. But it's not easy. You might shrug dismissively when you hear that the good ship Snowball has rooms to explore, but let's see your eyebrows stay as steady as Spock's when I tell you the ship is five miles long and has 7,000 rooms.

Breathe easy. You can cut down; at best you need only visit 170 or so. While adventuring, you must solve many puzzles. What use are a Maxwell sink, a 101-way ribbon cable, a mempack, and a holowand? Who are Angel and Nightingale? What are eatsuckers and bumble bearings?

With detailed descriptions, plenty of puzzles, an interesting plot and a very fast response to input, this latest adventure from Level 9 continues its high standard and gets my seal of approval.

THE GOLDEN BATON

This is the first in the excellent series of Mysterious Adventures, all ten of which are available for the Commodore 64. The adventures are the standard text variety — with added extras.

Each location is attractively presented as a colourful, hi-res picture, but at any time you can switch between graphics/text and text only. The input parser accepts commands that feel more natural than the usual verb-noun type.

The plot concerns the whereabouts of the Golden Baton, a priceless artefact stolen from the palace of King Ferrenuil. Unless you recover it, evil times will come upon your homeland. The adventure has a good collection of puzzles, some fairly easy, some tough.

Clearly much care has gone into the writing of the adventures (and the hint sheets). The programs have strong, tight plots and imaginative settings.

EXPLORING ADVENTURES

INVALID MOVE! SOUTH-- CMD

An unusual one, this. Published by Duckworth, an established book publisher, you get three adventures on one tape, and there's a companion book, 'Exploring Adventures on the 64', also published by Duckworth and costing £6.95.

The three adventures are Castlemaze, Tunnel and Underground. They are straightforward text-onlies involving a search for treasure or a key through a labyrinth of caves, solving puzzles and dealing with thieves, sorcerers, spiders, snakes, gargoyles and other beasties.

You can buy the book and type them in (the book has a lot more about adventures), save your fingers and buy the tape. Although small and a little lacking in originality, three adventures for 7.95 is good value.

FORESTLAND

From Supersoft comes this arboreal text-only adventure. You awake from a dream-troubled sleep to find yourself walking along a shady woodland path. Are you still dreaming or is this really happening to you? If it is real, what on earth are you doing here, and, even more worrying, will you ever find the way back to your warm bed? It's no good reading the cassette inlay for clues — it tells you how to play, not what it's about.

Following the path soon brings you to a tree with a door in it. No prizes for guessing you're going to need a key. And what's this large rabbit-hole? You can bet you're going to need light to peer down there but Forestland doesn't hand one to you on a plate.

The program accepts more complex input than just verb plus noun — commands such as "Put the green apple in the bag" can be used. Responses are instantaneous. The location descriptions are quite detailed and add to the enjoyment (so much better than the bare 'You are in a cave. You can go east' type of narrative. Forestland has a 'curioser and curioser' feel, but don't let that hole lead you to expect a white rabbit.

This is an interesting and fairly testing adventure which should appeal to most players.

GOBLIN TOWERS

INVALID MOVE! SOUTH-- CMD

Another one from Supersoft, this is more suitable for the novice adventurer (though an awkward maze and a sedentary giant puzzled me for a while).

The plot is straightforward — enter the ancient castle known as Goblin Towers, get the treasure, and get out. All good, clean fun — but beware the axe-swinging goblin.

Again, fairly complex sentences can be handled and response is immediate — no twiddling of thumbs waiting to be told 'You can't do that'.

It's certainly worth a try if you're new to adventuring.

RING OF POWER

Like Golden Baton, this offers optional graphics with the text: But there the similarity ends. Each location in Ring of Power is boringly shown as three walls, adding nothing to the game.

Fortunately, the graphics can be switched off, although the instructions don't tell you how (type PIC or TEXT). Small hi-res pictures of objects appear in both modes — a novel feature.

The vocabulary is limited, the setting (mostly in a house) dull and the text, when not in graphics mode, all lower case even when it shouldn't be, like starting a sentence or using the word I.

Although the program shows promise, it really needs a good overhaul. Its shortcomings detract from its merits and it falls short of Quicksilva's usual standard.

Snowball (£9.90) Level 9 Computing, 229 Hughenden Road, High Wycombe, Bucks HP13 5PG.
Golden Baton (£9.95) Channel 8 Software, 51 Fishergate, Preston, Lancs.
Exploring Adventures (£7.95) Duckworth, The Old Piano Factory, 48 Gloucester Crescent, London NW1.
Forestland, Goblin Towers (£9.95 each) Supersoft, Winchester House, Canning Road, Wealdstone, Harrow, Middx HA3 7SJ.
Ring of Power (£9.95) Quicksilva, 55 Haviland Road, Ferndown Industrial Estate, Wimborne, Dorset.

SPECTRUM ACTION

Dimension of death

Name Dimension Destructors **System** 48K Spectrum **Price** £5.95 **Publisher** Artic Computing, Main Street, Brandesburton, Driffield YO25 8RG Tel: (0401) 43553 **Format** Cassette **Language** Machine code **Other versions** None **Outlets** Mail order and Spectrum dealers.

Three dimensional games seem to be all the rage at the moment. Artic, having already published a very good tank battle program, throw another 3D hat into the ring with Dimension Destructors, an impressive 'coming-at-you' space saga.

Objectives

Accustomed as you are to boldly going where no-one has gone before, you are not surprised to see dots appear on your scanner. As your ship hurtles onward, the dots grow larger until they are plainly visible as alien spacecraft, bent on destroying you. Swooping and soaring, they grow ever larger as they rush toward you.

In play

The opening title and credits roll up and away into the distance in Star Wars fashion, thus getting you into the appropriate mood for battle against insuperable odds. Against a star-filled backdrop, several yellow spots appear, weaving in and out of a white, hollow, centred X, your laser cannon sight. While the aliens are far off, they appear as small wire-frame triangles, swiftly expanding in size as they race toward you.

Firing your cannon sends a burst of laser beams toward the centre of your sight, destroying any enemy craft caught in it. As the enemy get nearer, their dimensions expand realistically and alarmingly. By diving, rising or swinging your sight around, you might be lucky enough to see the enemy go hurtling past, above, below or to one side of you. Make sure you're sitting on the floor when you play this game — on several occasions, I nearly fell off my chair while trying to pull hard to port to evade a rapidly approaching space ship, so realistic is the three-dimensional effect.

Polishing off the yellow pyramids only serves to annoy the aliens. Soon, more traditionally styled space fighters are on their way, together with more pyramids, though these are a different colour to the first lot. If your ship is hit, one of the shields is destroyed; this is manifested by what appears to be, anachronistically, a cracked windscreen (Earth technology at its best).

When all your shields have been hit, your heroism is at an end.

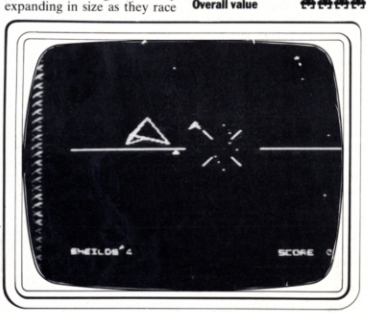
Verdict

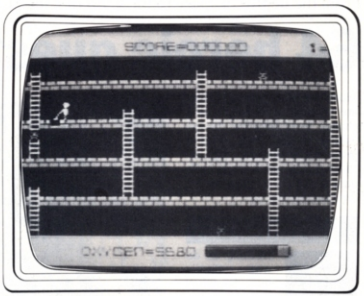
Realistic, perspective graphics which make for an exciting space romp. Health warning: wear a seat belt while playing it.

Bob Chappell

RATING

Lasting appeal	
Playability	
Use of machine	
Overall value	





Dig for victory

Name Sheer Panic **System** Spectrum 16/48K **Price** £5.95 **Publisher** Visions, 1 Felgate Mews, Studland St, London W6 **Format** Cassette **Language** Basic **Other versions** None **Outlets** Mail order

Sheer Panic is another version of that well-known game involving running up and down ladders and beating aliens over the head with a shovel. According to Visions you are 'mining for magnetic quartz in a Dromedan Leisure Complex . . .' Oh, never mind all that, we all know the objective is hitting meanies with shovels and amassing high scores for doing so.

First impressions

Visions is a new company which has launched itself Imagine-style with lots of glossy colour adverts, though the spending doesn't stop when it comes to the cassette either, with a full-colour cover showing a cartoon of a demented earthling attempting to deal with a host of slavering aliens.

In play

The instructions are included in the game, should there be anyone who needs them, and Sheer Panic can be played with either a Kempston joystick or keyboard control. This layout is a little confusing, to say the least, using the already silly arrangement of arrow keys and then rearranging them! So, the down arrow moves you left, the up arrow right, the right arrow up and the 9 key down. The joystick, too, takes more than a little getting used to, the digging being done by pushing the joystick up but in the direction you're facing, *ie* north west or north east, and any rapid repair work by moving it south west or south east.

Nimble footwork proved a problem at first, as the stick also seems to have to be centred each time before the little man would start moving. One or two nasty deaths resulted, but perseverance was rewarded with a certain dexterity.

As to the man, he's your typical Swan Vestas creation, though he leaps about smoothly enough once the controls have been mastered.

In case you don't know, the idea of the game is that you're running round a construction of platforms and ladders, pursued by meanies. You can dig holes, and if a meanie falls in and you can hit it on the head it goes to meet the meanie maker. In this version there are red meanies who have to plummet through one hole, blue ones who need two holes beneath each other to see them off, and white ones who require three holes.

There's no choice of skill level but the game will progress through nine levels as you go, with a maximum of seven meanies after you are one time.

Verdict

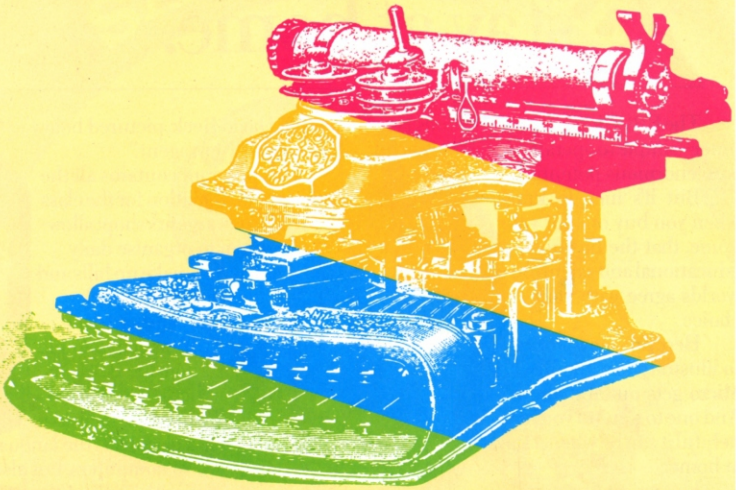
Yet another variation on yet another arcade game, it's as good as any of the other 57 varieties around, though if the graphics matched the cassette cover it would be a winner.

Mike Gerrard

RATING

Lasting appeal	
Playability	
Use of machine	
Overall value	

WHAT EVER THE HARDWARE...



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Not all home computers stay at home.

The BBC Micro is the ideal family computer–simple to operate, yet fast, powerful, with enormous potential.

But it's nice to know, when you buy one for your home, that the business, educational and scientific worlds agree with your choice.

Here are a few stories to illustrate how the BBC Micro gets out and about. And one to remind you how helpful it can be when it stays at home.

A practical lesson in business admin.

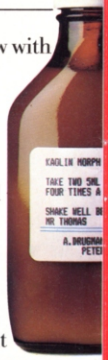
The contribution of the BBC Micro in the classroom has long been recognised at Perins Community School in Hampshire.

The School has 12 BBC Micros used extensively across the syllabus: in fact some pupils are using them to study for their GCE O Levels in computing.

One of the programs available to Perins teachers such as David Beck, pictured below with his class, is "Newsagent."

This program contains all the necessary information for the class to run a newsagent's shop; allowing them to organise daily deliveries, make up bills and keep an eye on stock control and ordering.

It's a nice example of how the BBC Micro can be used not only to acquaint a class with the language of computers, but also with some of the realities of the community in which they live.



Correcting Jodrell Bank.

The BBC Micro is a familiar worker around Jodrell Bank.

You'll find it in the reception area explaining the workings of a radio telescope to visitors, for example.

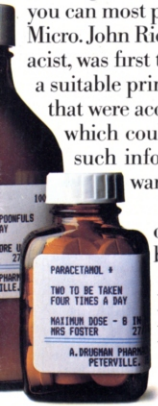
But it's also been helping in a more testing task: to improve the performance of the Defford telescope.

In this application it has been used to make calculations necessary to determine the precise parabolic shape of the dish.

Theodolites are used to do the measuring–then the BBC Micro works out the necessary corrections.

The end of the scrawl.

If any of you have noticed how much easier it is to read and understand labels on drugs and medicines these days, then you can most probably thank the BBC Micro. John Richardson, a Preston pharmacist, was first to realise how a micro with a suitable printer could produce labels that were accurate and legible and which could include, automatically, such information as drug reaction warnings.



At the same time it could record drug usage for better stock control.

He chose the BBC Micro for its versatility and potential for expansion.

John Richardson believes that this system will be recognised as standard in the profession and be used in hospitals, health centres and pharmacies throughout the UK.

Meanwhile back at home.

Dr. & Mrs. Yarwood bought a BBC Micro as a birthday present for their 12 year old daughter.

However, it quite quickly became common property.

All three can now write their own programs. Mrs. Yarwood is particularly proud of one program she has compiled to help teach her daughter French vocabulary.

They all agree that although the Micro is fast and powerful enough to be at home in Jodrell Bank, it is also the ideal computer at the Yarwood home: simple to set up (virtually any TV set and cassette player is all you need) and simple to use.

All this for only £399.

The BBC Micro comes with a comprehensive, step-by-step User Guide which introduces you to your micro and shows you how to construct useful programs of your own.

You will also receive a free "Welcome" cassette which contains 15 different programs for you to experiment with, ranging from music and graphics to games like Kingdom and Bat 'n' Ball.

The BBC Micro is available from W H Smith Computer Shops, Boots, John Lewis and local Acorn stockists.

Alternatively if you would like to order one with your credit card or if you want the address of your nearest supplier just phone 01-200 0200 or 0933-79300.

The BBC Microcomputer System.

Designed, produced and distributed by Acorn Computers Limited.

Which book would your micro want you to buy? *PCN*'s review page helps you choose.

'Tim Hartnell's Giant Book of Computer Games' by Tim Hartnell, published by Fontana at £3.95 (paperback, 386 pages).

The author has taken a giant step back in time to compile a book crammed with old standbys such as awari, nim, mastermind, Eliza and lunar lander, and although the book in some ways is bang up to date, with adventure games and simulations, you would never guess from it that graphics, sound or colour had been invented.

But that is the point: all the programs will run on any machine with Basic. With so many different machines and PEEK and POKE about, it's time someone showed that most computers are the same beneath their plastic skin.

There are 44 programs with games of all types: skill, luck and fantasy. Most fit in 8K, but one adventure game takes 17K! All I tried seemed to work perfectly. The listings are easy to follow and, as intended, easy to alter. Some are explained in detail, some get a few REMS, but almost all have a very useful sample output.

What bugs there are seem to be in the text (the Shogun text says game over when you capture six men — the program only ends on seven captures). Error-trapping is poor in that you can enter illegal moves and get away with it. To improve this would, of course, make the programs unwieldy, but Mr Hartnell could have given a couple of pages to this problem and less to the chess program.

This listing gets a lot of prominence, but if you're tempted to buy the book only because of this, don't. It plays an awful, illegal game and bears no resemblance to how commercial chess programs are written.

But if you want a good ideas book — and every programmer should have one — this is the most up-to-date of its type and at the price is a real bargain. It would make a good stocking filler.

JF

'The Software Bus' by A Clarke, J M Eaton, D Powys-Lybbe, published by Sigma Technical Press (distributed by John Wiley) at £8.95, (paperback, 332 pages).

It's a real pleasure to find a book which explains CP/M properly, without resorting to mind-grinding grammar. After reading this book the internal operation of all versions, including MP/M, Concurrent CP/M and CP/M 3.x (aka CP/M Plus) become reasonably understandable.

CP/M has a deserved reputation as a standard, with all the features and facilities that are reasonable on small machines, but it also has something of a reputation as an ogre, at least when it comes to programming.

Part of the reason for this was that the documentation was, (and in general still is), unreadable.

This book, however, clarifies things wonderfully. Each chapter expands the subject, and gives useful examples of command-line switches . . . for example, how to get the maximum information (for development) when using a compiler or how to use the machine most efficiently (for production).

The Transient Programs (PIP, STAT, SUBMIT, DDT, ED and so on) are documented clearly, with a very useful quick-reference section on each. 'Standard' software is given the same exhaustive treatment, including Wordstar/Mailmerge, several languages, and some good assemblers.

More usefully, the same is done to the kind of system-functions which are essential to write editors, compilers, linkers and so on. If you read this book thoroughly you'll be able to do anything you want with the system.

But this book is even better than that. It's the only one I've seen which explains (in English) how to use real systems-programming tools, like linkers and relocating assemblers.

It makes a completely adequate substitute for the standard system-documentation. It's not only smaller, but far more readable.

RK

'How to Maintain and Service Your Small Computer' by J G Stephenson and B Cahill, published by Howard Sams through Prentice Hall at £15.25 (paperback, 206 pages).

This book expounds the virtues of self-help, encouraging users to do many simple repairs themselves. The authors start with the premise that all micros will break down or need servicing, and that much of this maintenance does not require specialist (and therefore expensive) attention.

The first three chapters detail equipment available in the US (since this is an American based book), and how to service it. The next two give an interesting background to servicing, including preventative maintenance, safety, and instruments you might need.

The book goes on to the practicalities of servicing and then covers the specific parts of a computer system, chapter by chapter, including disk drives, printers, the computer and its keyboard, smaller peripherals and power supplies.

Appendices include an excellent troubleshooting chart with a simple diagnostic reference guide.

This book is particularly useful to someone wanting to learn about the insides of micros, and how to analyse and solve problems. Although expensive at more than £15, it could save much more in reduced servicing bills.

PL

'The Academic Apple' by Richard Mowe, published by Reston Publishing Company (distributed by Prentice-Hall) at £9.30 (paperback, 162 pages).

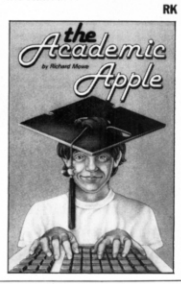
It can be difficult to discern why some books are published, or at least why, having been written for a particular market, the publisher decides to import it into another.

This book is a classic example of one which, though relevant and acceptable in the USA, is out of place in Britain. It's a combined tutorial and workbook with notes for parents or teachers, which introduces the Apple microcomputer as a school subject.

This is all very well in California. It's Apple Bill provides massive subsidies for schools to buy machines and software so the place is flooded with computers, mainly Apples. But that's not the case here. Nor are the education systems the same.

Educational references aside, the actual material is little better. The examples of Basic programming are frankly atrocious . . . the jobs are unimaginative, poorly developed, nothing like bombproof, as well as having GOTOs all over the place, jumps to REMark statements and so on. And the worksheets don't raise the standard.

RK



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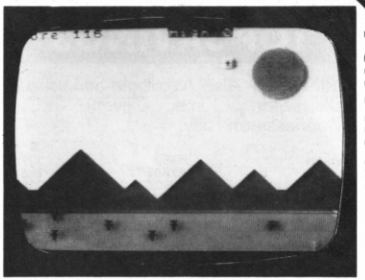

```
  1 LET high=0
  9 GO SUB 5000
 10 DATA BIN 00000001,BIN 00000
011,BIN 00000111,BIN 00001111,BI
N 00011111,BIN 00111111,BIN 0111
1111,BIN 11111111
 20 DATA BIN 10000000,BIN 11000
000,BIN 11100000,BIN 11110000,BI
N 11111000,BIN 11111100,BIN 1111
1110,BIN 11111111
 30 FOR x=0 TO 7: READ y: POKE
USR "a"+x,y: NEXT x
 40 FOR x=0 TO 7: READ y: POKE
USR "b"+x,y: NEXT x
 50 BORDER 0: PAPER 5: INK 1: C
LS
 60 PRINT AT 12,0;"                AB
                                  A  B
      AB          AB          AB  A  B
     A  B  AB    A  B  AB AB  A  B    BA
    A    BA  A  B      A  B  A  B
   BA        BA
  BA
 70 PRINT PAPER 4;"
```

```
 80 FOR x=0 TO 20: CIRCLE INK 6
;200,140,x: NEXT x
 90 DATA BIN 00011000,BIN 00111
100,BIN 01100110,BIN 01111110,BI
N 00111100,BIN 00100100,BIN 0100
0010,BIN 00100100
 95 DATA BIN 00010010,BIN 00011
100,BIN 00001000,BIN 00101010,BI
N 00011100,BIN 00001000,BIN 0000
1000,BIN 00001000
 97 FOR x=0 TO 7: READ y: POKE
USR "c"+x,y: NEXT x
 100 FOR x=0 TO 7: READ y: POKE
USR "d"+x,y: NEXT x
 101 PRINT INK 6; PAPER 4;AT 19,
1;"D";AT 20,4;"D";AT 19,15;"D";A
T 19,9;"D";AT 18,4;"D";AT 20,13;
"D";AT 19,24;"D";AT 18,30;"D";AT
 21,26;"D"
 103 LET c=15: LET d=5: LET scor
e=0: LET life=9
 104 PRINT AT 0,0;"Score:";score
AT 0,15; INVERSE 1;"High:";high
 105 LET x=5: LET y=0
 107 LET x=(INT (RND*3)-1)+x: IF
x>7 THEN LET x=x-2: GO TO 107
 108 IF x<3 THEN LET x=x+2: GO T
O 107
 110 IF ATTR (x+1,y+2)=46 OR ATT
R (x-1,y+2)=46 OR ATTR (x,y+1)=4
6 THEN GO TO 200
 115 GO SUB 500
 117 IF x=d AND y=c THEN LET sco
re=score+(25-y): PRINT AT 0,6;sc
ore: BEEP .2,10: BEEP .3,20: GO
TO 105
 120 PRINT INK 2;AT x,y;"C"
 130 BEEP .1,x+5: PRINT AT x,y;"
": LET y=y+1: GO TO 107
 200 PRINT AT x,y; BRIGHT 1; INK
2; PAPER 5;"*": READ e,f: PRINT
AT e,f; INK 3; PAPER 4;"D"
 210 FOR t=0 TO 1 STEP .05: BEEP
.01,t: NEXT t: FOR t=1 TO 0 STE
P -.05: BEEP .01,t: NEXT t
 220 PRINT AT x,y; PAPER 5;" "
4;"D"
 240 LET life=life-1: IF life=0
THEN GO TO 1000
 245 DATA 19,1,20,4,19,15,19,9,1
8,4,20,13,19,24,18,30,21,28
 250 GO TO 105
 500 PRINT AT d,c;" "
 505 IF INKEY$="5" THEN LET c=c-
1: IF c<0 THEN LET c=0
 510 IF INKEY$="8" THEN LET d=d+
1: IF d>7 THEN LET d=7
 520 IF INKEY$="7" THEN LET d=d-
1: IF d<3 THEN LET d=3
 530 IF INKEY$="6" THEN LET c=c+
1: IF c>20 THEN LET c=20
 550 IF INKEY$=CHR$ 8 THEN LET c
=c-2: IF c<0 THEN LET c=0
 560 IF INKEY$=CHR$ 9 THEN LET c
=c+2: IF c>20 THEN LET c=20
 570 IF INKEY$=CHR$ 10 THEN LET
d=d+2: IF d>7 THEN LET d=7
 580 IF INKEY$=CHR$ 11 THEN LET
d=d-2: IF d<3 THEN LET d=3
 590 PRINT AT d,c; INK 7;"#"
 600 RETURN
```

There I was sitting on the stoop watching the wheatfields swaying under the deep orange sun. Life was good, if a bit dull, on the colony worlds. If only I had qualified for star college instead of playing computer games all through my exams; oh to sit at the controls of a starfighter.

Suddenly a shadow crossed the sun. Looking up I vaguely caught sight of what appeared to be a space ship. Then the sound hit me like a solid thump in the chest.

Running across the wheatfields I wondered what had happened to the auto-defence system, probably the aiming computer had overheated again!

Entering the control shack I sat down at the controls and hit manual. Up on the screen flashed the hash sign, representing the sight. All I had to do was position it over the incoming aliens and hope that the auto system was operational. I had to save the crops at any cost, without them I'd starve.

This game, from R Blachford, puts you at the controls of the aiming computer and leaves it up to you to save the crops and the colony. If any of the aliens do get close to the sun the radiation from the ensuing explosion destroys some of your crops.

Title	***Colony Invaders***
Machine	***ZX Spectrum***
Application	***Game***
Language	***Basic***
Author	***R Blachford***

Program notes. . .

9	Gosub and print the instructions.
10-20	Data for the user-defined graphics. These are defined as an eight by eight grid of dots. The rows are shown here as 8 bit binary numbers.
30	Define UDG 'a', note the definition starts at the top.
40	Define the UDG 'b'.
50	Set the border, background (paper) and foreground (ink) colours.
60	Print the mountains onto the screen, the graphics character Graphic A and

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4 High Street, Chalfont St. Peter, Bucks. SL9 9QB

GRID BIKE

```
1000 RESTORE
1010 IF high<score THEN LET high
=score
1020 PRINT AT 10,10; FLASH 1; IN
K 0; OVER 1; PAPER 0;"crops  bur
nt";AT 11,10;"by radiation"
1030 FOR e=1 TO 1000: NEXT e
1040 GO TO 9
5000 BORDER 7: PAPER 7: INK 0: F
LASH 0: BRIGHT 0: OVER 0: INVERS
E 0: CLS
5010 PRINT "                    "
"...""                  ©1983 R.Blachford""
                for""  FLASH 1;"  Per
sonal Computer News
5020 PRINT ""
5030 PRINT TAB 1;"  You are in
charge of the  defence sectio
n of an Earth  colony. The co
lony has just  established it
self in a valley.  Unfortunate
ly,there is a  sudden invasio
n of peculiar  beings which f
ly beyond the  mountains.When
 they get too  close to the s
un, they blow  up giving off
rays which do  harm to the cr
ops.Your task  is to point th
e target spot  (#) at the inv
ader. The gun  will fire auto
matically."
5040 PRINT #0;" Press any key to
 continue..."
5050 PAUSE 0: CLS
5060 PRINT "you have nine lives
represented by an ear of yellow
corn in the valley.The black (b
urnt) ears represent lost lives
.) A life is lost when an inva
der gets too close to the sun
and blows up. You have nine li
ves (like a cat). Your final sco
re is the score that is displa
yed when allthe nine lives are l
ost and the colony starves becau
se of there being no harvest.
  You direct the targe
t by using the following keys:-
"
5070 PRINT "     "5"  - Left","     "6
"  - Down","     "7"  - Up","     "8"  -
 Right""Press CAPS SHIFT at the
 same time to move ""#"" twic
e target spot  (#) at the inv
ader. The gun  will fire auto
matically."
5080 PAUSE 0: RETURN
```

Graphic B are the points and the slopes of these hills.

70 Print the background of the plantation.

80 Draw the sun with a set of expanding circles.

90 Data for UDG 'c'.

95 Data for UDG 'd'.

97-100 Define the characters d and c.

101 Print the corn crop onto the screen. The corn is graphic 'D'.

103 Set up the playing variables.

104 Print the score and the high score headings.

105 Set the X and Y coordinates for the alien.

107 Select a random amount to add to the X value.

108 Check that the X value is large enough.

110 Check to see if the alien is too close to the sun.

115 Gosub and check the keyboard and update the position of the sight.

117 If the sight and the alien coincides then increase the score. Print the score and beep.

120 Update the position of the alien.

130 Beep, rub out the alien and continue the loop at 107.

200 Kill off a corn plant using the positions given in the data at line 245.

210 Do the dying noise.

220 Delete the alien.

240 Decrement the number of lives, and if they are zero then end the game.

245 This is the data for the order in which the corn plants are killed of.

250 Continue the game.

500 Rub out the gun sight.

505-530 Scan the keys (5, 6, 7, 8) and update the position accordingly.

550-580 Scan the double speed keys (shift 5,6,7,8) and update the position.

590 Print the gun sight.

600 Return to the calling routine.

1000 Reset the data pointers.

1010 Check if the new score is greater than the old high score, if so then update the high score.

1020 Inform the player that the crops have been destroyed.

1030 Pause.

1040 Restart the game.

5000 Set the screen colours for the title.

5010 Print the title.

5020-5040 Set the scene and prompt for more.

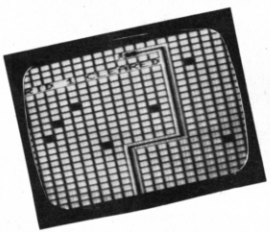
5050 Pause and clear the screen.

5060 More instructions.

5070 Controls.

5080 Pause and play the game.

GRID BIKE



Light cycles on the unexpanded Vic-20, impossible I hear you say — not so, because here they are. This game from David Pearson of York is a variation on the theme of light cycles called Grid Bike. You are presented with the multicoloured grid on which some men are stranded.

Your mission is to collect all the men without crashing your bike into the sides of the playing arena or your own trail. On the easy stages this is not really a great problem, but as you progress you will eventually want to try the harder version. Now you not only have to avoid your trail and the screen edges, you also have to dodge around some blocks that have been placed on the grid by the malicious maniacal machine (your computer under control of this program).

Accompanying the program are a set of notes that should help you to convert it to run on machines other than the Vic-20.

The program comes in two parts, the first being a loader program. This loads up the user-defined characters into the memory and gives the playing instructions. The second, which is auto run from the first using the method of POKEing the load/run instructions into the keyboard buffer, contains the game itself. The main program can be run over and over as long as the defined characters are not overwritten, but from a cold start the loader program needs to be used.

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GRID BIKE

Title *Grid Bike*
Machine *Vic 20 unexpanded*
Application *Game*
Language *CBM Basic*
Author *David Pearson*

1000 Change the pointers to the string storage and the maximum memory allowed for Basic to leave room for the character definitions.

1010-1020 Define the characters from the data in lines 9010 to 9100. Note that these characters are defined on an 8 by 8 grid, using eight numbers between 0 and 255 to define each row, starting at the top.

5000 Print the codes to clear the screen and set text colour to white

5010 Set the screen colours, background and border to black.

5020-5175 Playing instructions and keypress prompt.

5180 Get any key from the keyboard, note that GET does not wait for a keypress and will return null if no key is pressed.

5190 Clear the screen.

5200 A few more instructions.

5300-5400 This POKEs Lo (carriage return) Ru (carriage return) into the keyboard buffer and sets the buffer pointer to 7 for 7 characters.

9000-9100 Data for the defined characters, note that the characters are one per line.

MAIN-PROGRAM NOTES

0 Set QWE to a random number using TI as a seed.

1 Clear all the variables from memory while leaving the program intact.

2 Prompt for easy or hard.

3 Validate the answer.

5 Clear the screen and set the sound volume to full; set the start of the character memory.

10 Set up the variables used in the game.

45 Border colour is yellow, background colour is white.

50 Fill the screen with user defined character 2.

80 Fill the screen colour memory with blue, thus making all the characters POKE into the memory blue.

96 Fill the screen memory with user-defined character 9.

97 Fill the screen colour

```
1000 POKE52,28:POKE56,28:CLR
1010 FORI=7168TO7256:POKEI,PEEK(I+25600):NEXT
1020 FORJ=7168TO7256:READ0:POKEJ,0:NEXT
5000 PRINT"■■"
5010 POKE36879,8
5020 PRINT"      ■ GRID BIKE "
5030 PRINT"■YOU ARE THE DRIVER "
5040 PRINT"OF THE GRID BIKE."
5050 PRINT"YOU MUST DRIVE ROUND "
5060 PRINT"THE GRID PICKING UP"
5070 PRINT"THE PEOPLE."
5080 PRINT"AS YOU DRIVE AROUND"
5090 PRINT"THE GRID YOU LEAVE A"
5100 PRINT"TRAIL."
5110 PRINT"IF YOU RUN INTO IT"
5120 PRINT"YOU WILL BE KILLED."
5130 PRINT"Z=LEFT"
5140 PRINT"X=RIGHT"
5150 PRINT"L=UP"
5160 PRINT".=DOWN"
5170 PRINT"■          PRESS ANY KEY"
5175 PRINT"■■BY D.PEARSON"
5180 GETR$:IFR$=""THEN5180
5190 PRINT"■"
5200 PRINT"THIS PROGRAM LOADS THEGRAPHICS,SO LOAD IT   EVERY TIME"
5300 POKE198,7:POKE631,76:POKE632,207:POKE633,159:POKE634,13
5400 POKE635,82:POKE636,213:POKE637,13
9000 DATA0,231,255,255,255,255,231,0
9010 DATA126,126,126,60,60,126,126,126
9020 DATA255,129,129,129,129,129,129,255
9030 DATA24,24,24,24,24,24,24,24
9040 DATA0,0,0,255,255,0,0,0
9050 DATA0,0,0,31,31,24,24,24
9060 DATA0,0,0,248,248,24,24,24
9070 DATA24,24,24,248,248,0,0,0
9080 DATA24,24,24,31,31,0,0,0
9090 DATA255,255,255,255,255,255,255,255
9100 DATA28,28,8,62,8,20,34,65,0

READY.
```

```
0 QWE=RND(1-TI)
1 CLR
2 PRINT"■■DO YOU WANT EASY(■E■) OR HARD (■H■)" INPUTTYU
3 IFTYU<>RTYU<2THEN2
5 PRINT"■":POKE36879,15:POKE36869,255
10 A=8174:GRID=1:CH=1:DF=1:WT=3:NW=3:D=-22:SC=0:MAN=1
45 POKE36879,56
50 FORN=7680TO8185:POKEN,2:NEXT
80 FORN=38400TO38905:POKEN,6:NEXT
96 FORN=7680TO8164STEP22:POKEN,9:NEXT
97 FORN=38400TO38984STEP22:POKEN,0:NEXT
98 FORN=1TOMAN:RP=INT(RND(1)*506)+7680:IFPEEK(RP)<>2THENRP=RP+1
99 POKERP,10:NEXTH
100 IFTYU=1THEN103
101 FORN=1TO10:SP=INT(RND(1)*506)+7680:IFPEEK(SP)<>2THENSP=SP+1
102 POKESP,230:POKESP+30720,0:NEXT
103 POKER,CH:POKER+30720,2:POKER+(-D),WT
104 POKE36874,196:POKE36875,196:POKE36876,176
105 OD=D
106 IFNW=0THEN110
107 WT=NW
110 GETR$
120 IFR$="Z"THEND=-1:WT=4:CH=0
130 IFR$="X"THEND=1:WT=4:CH=0
140 IFR$="L"THEND=-22:WT=3:CH=1
150 IFR$="."THEND=22:WT=3:CH=1
160 A=A+D
162 IFPEEK(A)>2ANDPEEK(A)<100PPEEK(A)=230THEN4000
163 IFPEEK(A)=10THENGOTO6100
165 GOTO3000
180 IFA<76800RA>8185THENGOTO4000
190 GOTO103
3000 IFOD=-22ANDD=-1THENNW=4:WT=6
3010 IFOD=22ANDD=-1THENNW=4:WT=7
3020 IFOD=-22ANDD=1THENNW=4:WT=5
3030 IFOD=22ANDD=1THENNW=4:WT=8
3040 IFOD=1ANDD=22THENNW=3:WT=6
3050 IFOD=1ANDD=-22THENNW=3:WT=7
3060 IFOD=-1ANDD=-22THENNW=3:WT=8
```

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GRID BIKE

memory with black.

98-99 Put men onto the screen in random positions, MAN is set to one in the first go.

100 Check the difficulty, if it is easy then don't put the random blocks onto the screen.

101-102 Put ten random blocks onto the screen and colour them.

103 Put character CH (Bike character 1 or 0) into the screen memory specified by A. At the start of the game this is 8174 which is line 22, 10 characters across (bottom centre). This is then coloured red and a trail is left behind it by subtracting the movement amount D from A. The trail is in WT (chars 3 to 8 depending on the direction). Note that this line is the beginning in the main loop.

104 Make the bike noise using a mixture of low medium and high range tones.

105 Remember the old direction/position before changing it. Saved in OD.

106 Check the trail.

107 Get new trail if not zero.

110 Get a key from the keyboard without waiting for it to be pressed.

120 'Z' is left, thus D is set to — 1, the trail and the bike are set to their horizontal values.

130 'X' is right.

140 'L' is up and D is set to −22 (this is the amount added to A for the new position). CH is set to the vertical character.

150 ',' is down.

160 Update the screen position of the bike.

162 Check for a crash.

163 Check to see if a man has been picked up.

165 Jump to corner routines at 3000.

180 Check to see if the bike has gone off the screen, if so then end game.

190 Keep on going through the loop.

3000 Set characters for up to left, puts and angled corner character onto the screen.

3010 Down to left.

3020 Up to right.

3030 Down to right.

3040 Right to down.

3050 Right to up.

3060 Left to up.

3070 Left to down.

```
3070 IFOD=-1ANDD=22THENNW=3:WT=5
3080 GOTO180
4000 POKE36874,0:POKE36875,0:POKE36876,0
4001 FORKN=1TO10
4002 QW=128
4010 FORN=0TO7
4020 POKE(A+-D)+30720,N
4030 POKE36877,QW
4035 QW=QW+5
4040 NEXT
4050 NEXT
4055 POKE36877,0
4060 FORMJ=1TO250:NEXT
4070 POKE36869,240
4080 PRINT"■■"
4090 POKE36879,8
4100 PRINT"      ■ GRID BIKE "
4110 PRINT"■■■YOUR SCORE=";SC
4120 IFSC>HSTHENHS=SC
4130 PRINT"■HIGH SCORE=";HS
4140 PRINT"■■ANOTHER GAME(Y/N)"
4150 GETA$:IFA$=""THEN4150
4151 RESTORE
4160 IFA$="Y"THENGOTO4200
4170 IFA$="N"THENEND
4180 GOTO4150
4200 PRINT"DO YOU WANT (■1■)EASY OR (■2■)HARD
4210 INPUTTYU
4215 IFTYU<1ORTYU>2THEN4210
4220 PRINT"■":POKE36869,255:GOTO5
6100 DF=DF+1
6102 SC=SC+10
6105 IFDF<MANTHEN165
6110 PRINT"■":POKE36874,0:POKE36875,0:POKE36876,0
6120 PRINT"■■■■■■GRID";GRID;"CLEARED"
6125 FORRT=1TO2500:NEXT
6130 DF=0:MAN=MAN+1:GRID=GRID+1:SC=SC+100:A=8174:
     D=-22:WT=3:CH=1:NW=3:GOTO45
```

3080 Return to main routine.

4000 Turn off sounds.

4001-4050 When/if you've crashed, this routine flicks the bike character through all the colours ten times by POKEing the colour memory with the colours specified by N. This line also triggers the noise generator for a crash sound.

4055 Turn the noise off.

4060 Pause for a bit.

4070 Reset the character memory.

4080 Clear the screen and set the printing colour.

4090 Set the foreground and background colours.

4100-4140 Print score and prompt for another game.

4150 Scan keyboard for answer.

4151 Reset the data pointers.

4160-4180 Validate and act on the reply.

4200-4220 Prompt for and get the difficulty, then clear the screen and restart the game.

6100 Increment the number of men picked up.

6102 Increment the score by ten.

6105 Check whether all of the men have been picked up.

6110 Turn off all the sound.

6120 Tell the player that the grid has been cleared.

6125 Pause.

6130 Set up the variables for the next stage in the game.

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Aussie Apple

A Wombat is not an Apple — and that's official. Or at least according to the Australian Federal Court it is. This slightly less than fascinating piece of information comes to us with the aid of Apple Computer, which has failed to win an Australian court order prohibiting the sale of Taiwanese Wombats, which are of course Apple look-alikes.

The court ruled that the Apple and Wombat were clearly distinguishable by name, and that the Wombat distributor wasn't guilty of misrepresentation. So it's OK to sell Apple clones in Australia, provided they're not called Apple.

Loony language

3. Install the ribbon cartridge in the manner of followings – see Figure 3.

c. Hold the cartridge with the plastic knob be at left and top side, then set it on the two side frames of printer mechanism with tilting the cartridge so the two front hooks on the side frames be engaged with two catches on both left and right sides of bottom of cartridge, then steer down with pressing the ribbon side so the two side tabs of cartridge be slided into the slits on the side frames of printer mechanism.

Spotted any good misprints lately? Any strange pieces of English written about micros? We'll offer a crisp fiver for any that are funny enough to print.

Here's an example from the Micro Graphic printer manual to get you started — look out in *PCN* next week for more. Send any that you find to *PCN* at Evelyn House, 62 Oxford St, London W1.

NEXT WEEK

***Software* — pride of place in our last issue of the year goes to a 16-page software buyer's guide.**

***Hackers* — a look at the shadowy activities of the computer hackers.**

***Microdrive* — how to put your programs on to Sinclair's storage device.**

***Games* — Soccer for the 64, and reviews of other games for the Spectrum, Atari, Vic-20 and Dragon.**

***Artistry* — do-it-yourself with the Spectrum games designer, under the microscope in this feature.**

SYNTAX ERRORS

Stumbling over words

As a consequence of the excessively user-friendly presentation of the Newbrain WP series, we inadvertently missed out a crucial subroutine. So you'd best GOSUB:

```
9299 REM PRINT INDEX
9300 PUThm: FORa=1TOss :PUTb1
:?pg3(a) :NEXT a:? 1n$:RET
```

Offended author

In issue 40 we attributed authorship of the Vizawrite review to Trevor Jones. The real author was Russell Jones — sorry about that, Russell. We also managed to leave out Russell's ratings for the package: Features 4, Documentation 4, Performance 4, User Interface 5, Reliability 4, Overall Value 4.

PCN DATELINES

PCN Datelines keeps you in touch with up-coming events. Make sure you enter them in your diary.

Organisers who would like details of coming events included in PCN Datelines should send the information at least one month before the event. Write to PCN Datelines, Personal Computer News, 62 Oxford Street, London W1A 2HG.

UK EVENTS

Event	Dates	Venue	Organisers
Your Computer Christmas Fair	December 15-18	Wembley Conference Centre	Reed Exhibitions, 01-643 8040
Which Computer? Show	January 17-20	NEC, Birmingham	Clapp & Poliak Europe Ltd., 01-747 3131
Northern Home Entertainment Show	January 19-22	Excelsior Hotel, Manchester Airport	Stamley Wire Advertising Ltd., 01-253 6637
Acorn Education Exhibition	January 25-27	Central Hall, Westminster	Computer Marketplace (Exhibitions) Ltd, 01-930 1612
Peripherals Suppliers	January 31-February 2	Cunard International	Reed Exhibitions, 01-643 8040
Communications & Computer Systems Fair — CABLES LET '84	February 2-4	Pontin's, Prestatyn, Wales	Pontin's Ltd., 07456 2267
International Home Computers, Video Games & Software Exhibition	February 13-15	Heathrow Penta Hotel	Anthony Farrar, 0923 774262
Information Technology & Office Automation Exhibition and Conference	February 13-15	Heathrow Penta	Wheatland Journals Ltd., 0923 774262
OEM Only Conference	February 21-24	Barbican Centre, London EC1	B.E.D. Exhibitions Ltd., 01-647 1001
Computer Trade Show	March 7	Hilton Hotel, London W1	Tom Lewis, 01-994 6477
	March 13-15	Wembley Conference Centre, Middlesex	Reed Exhibitions, 01-643 8040
Scottish Computer Conference	March 13-15	Holiday Inn, Glasgow	Quadrilect, 01-242 8697
Essex Apple Village	March 25-28	Festival Hall, Basildon, Essex	Database Publications, 061-456 8383
Computer Aided Design	April 3-5	Met. Exhibition Hall	Reed Exhibitions, 01-643 8040

OVERSEAS EVENTS

Event	Dates	Venue	Organisers
International Winter Consumer Electronics Show 22-25	January 6-10	Las Vegas, USA	Consumer Electronics Shows, Chicago, 0101 312 861 1040
National Software Show (East)	February 3-5	Miami Beach, Florida, USA	Raging Bull, USA, 0101 415 459063
Personal Business Computer Show	February 29-March 3	Hong Kong	Overseas Exhibition Services Ltd., 01-486 1951

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